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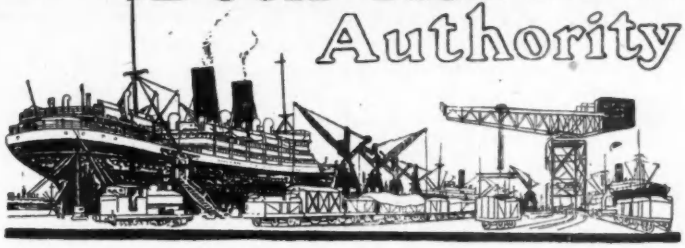

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Editorial Comments

The Port of Naples.

Almost anyone in this country could write quite a lot about the town of Naples and the charming allure of Italy and its people. The Gulf of Naples from Ischia to Capri presents one of the most magnificent prospects in the world, and authors of romantic fiction and travel books have never ceased to extol the unrivalled attractions of landscape and seascape. Some writers probably would also recall that the famous Marine Biological Institute, from the windows of which one sees a grand panorama of the Bay, was the first scientific Stazione Zoologica. It was established in 1872 by a German Zoologist, Anton Dohrn, and has since then been supported by all European countries in its marine researches. Signor Mazella, however, in his history of the Port of Naples, which will be found on the following pages, voices other views, and we who appreciate the magnetic glamour of the country, have for the moment to deal with matters of more serious concern.

Naples is pre-eminently a show place and holds a high, if not the highest, place in the World's ports for tourist traffic; which, in the parlance of economics, is a valuable invisible export of immeasurable goodwill. By all means encourage the incursions of tourists. It is one of the most profitable classes of sea transport, and one which has a direct and beneficial bearing on sociological relations between nations. In this respect the United Kingdom has no port to compare with Naples.

Signor Mazella's article expounds many of the problems with which this country also is faced. We unreservedly agree that to develop the trade of a port there is much more required than an efficient dock side service. There must also be an efficient inland transport, both road and rail, and further, there must be consumer and producer centres within easy economical reach. Generally speaking, export traffic is not so remunerative as import traffic, as the latter does not occupy the berths so long as the former. Therefore the constitution of the facilities to equate these differences must be given consideration in co-operation with the interested parties. The traffic of Naples is peculiar in this respect. The passenger traffic flows readily through the port, but unfortunately, the immediate hinterland does not produce the surplus tonnage balance of exportable goods to offset the imports, excepting in the coastal trade.

The harbour facilities are well balanced and are planned with operational skill. At the commencement of the recent war, the five miles of quayage were all served by rail, and 35 powerful electric cranes were disposed to deal efficiently with demand. There also were several graving docks, the largest being about 1,050-ft. long, 131-ft. wide and 42-ft. deep on the sill, with a double entrance.

The new detached breakwater at the head of the San Vincenzo mole, shielding the entrance of 1,000-ft. between it and the Antemurale from S.W. gales, removes much of the old navigational and ranging difficulty. There is another harbour entrance facing S.E. at the southern end of the Granili Mole. This leads directly into the New Commercial Harbour which is an extension of the old. It is worthy of remark that the three main breakwaters at Naples represent the bold enterprise and ability of the Italian Harbour Engineers among whom the late Professor Cöen Cagli was outstanding.

Naples will undoubtedly be one of the main beneficiaries from a settled peace and the return of prosperity to Europe.

Impact on Marine Structures.

The importance of obtaining reliable datae of full-scale tests of the stresses set up by the impact of vessels on marine structures is again brought into prominence by the contribution of Mr. H. T. Horsfield in this issue (p. 45). Apart from new design, the heavy recurring cost of maintenance in the repairs of fenders and structural members damaged by blows from vessels coming alongside calls for some careful and comprehensive full-scale research. Such investigation should be conducted not only from the point of view of assessing the mechanical forces that a structure may be called upon to resist, but also to find out the most efficient and economical methods and materials for fendering systems. To this end, it should comprise an element of Naval Architectural co-operation, so that the liability is not always solely on the shoulders of the harassed Harbour Engineer. This Journal, in co-operation with Mr. R. R. Minikin, has already endeavoured to enlist the assistance of Harbour Authorities to settle some of the relevant factors.

The response from all quarters of the world was encouraging, but limited. What did evolve, was that the average velocity of approach of vessels towards jetties was not so high as had been formerly supposed. It also showed a great diversity of practice in fendering systems, some naturally based on the local supplies of material and labour, and some, more elaborate, developed by private firms with patented rights.

The present example, probably the first test in this direction of the newly constituted British Railways Executive, is a forward step, but one which we trust will not end there. This is an important subject and one worthy of attention by the Central Authority.

Editorial Comments—continued

The Reconstruction of Custom House Quay, Dublin.

The May issue of this Journal contained a paper read by Mr. F. A. Bond, M.Inst.C.E.I. before the Institute of Civil Engineers of Ireland upon the Reconstruction of Custom House Quay, Dublin, and in the present issue we now publish excerpts from the discussion which followed.

It will be remembered that in our Editorial columns we drew attention to the extraordinary difficulties due to War conditions, which had to be contended with both in preparing the design for the new work as well as during construction at the site. The remarks of the Engineers taking part in the discussion will be read, therefore, with interest, for the majority of them appear to have fully realised the limitations set upon constructional methods by reason of lack of suitable materials and plant. Some speakers, however, suggested alternative methods of construction which they had used elsewhere in what they supposed to be similar or comparable situations.

In particular, attention is drawn to the remarks of Mr. Mallagh upon the " pocket " system of construction of quay walls, adopted at the General Terminus and Plantation Quays, Glasgow, in 1932.

Mr. Bond's reasons appear to be conclusive why this system, or a modification of it, however applicable elsewhere, could not have been successfully used at Dublin—principally by reason of the pressure of hard boulder clay unsuitable for grabbing without the use of explosives, which were unobtainable during the War.

The system described by Mr. Mallagh on account of its simplicity, cheapness and flexibility however has much to commend its use in tidal waters of rivers and estuaries and is therefore worthy of examination where the subsoil is of a suitable nature.

The attention of our readers is also directed to the somewhat unusual design of the transit shed, described in detail in Mr. Bond's paper and commented upon by several members in the discussion. In this instance again design was influenced to some extent by the availability of materials and further by the necessity for making the utmost use of the site area which was limited in width by the quay and public road.

The outstanding feature of the shed is the provision of an upper deck for open storage of unbonded goods which would take no harm from weather conditions, the possibility in the future being visualised of installing transporter equipment to convey goods from the upper deck into the Board's Custom House Docks.

It will be observed that the internal width of the shed is 28-ft. 4-in. with a line of columns down the centre. There was apparently insufficient reinforcement steel available for the design to have been modified to enable deeper transverse beams to be used, of sufficient strength to eliminate the necessity for the centre columns which obstruct the shed floor and reduce its storage space.

The common problem of water leakage through a flat asphalt-covered upper deck or roof appears to have been successfully overcome in this particular instance by two coat work of slightly modified road asphalt and the judicious staggering of construction and expansion joints, the latter being at the very close interval of 20-ft.

Dock Labour in Northern Ireland.

For some considerable time past, proposals for the decasualisation of dock labour in Northern Ireland have been under discussion between the Minister of Labour for Northern Ireland, the Irish Trade Unions, and representative of Shipowners, and towards the end of March last, it was reported in the daily press that a measure of agreement had been reached. These reports, which were not officially confirmed at the time, are now known to have been premature, and from subsequent statements it appears that an officially approved scheme can no longer be expected.

The scheme, which it was hoped would have been acceptable to all parties, was based on the Report issued by the Fox Committee. This recommended the decasualisation of dockers at the ports of Belfast, Londonderry and Newry, provided that there were on the port registers sufficient, and not more than sufficient, dock workers to deal efficiently with the trade of the ports. The monetary arrangements would have been similar to those prevailing at English ports—that is a guaranteed minimum wage of £4 8s. 0d. per week, and the payment of 5s. attendance money for each of 11 attendances when no work is available.

A Decasualisation Scheme for Singapore.

Another port where a dock labour scheme is under review is Singapore. Here, according to an announcement by the Harbour Board, it has been arranged that selected stevedores and wharf workers will be placed on the regular staff of the Board and will be guaranteed 48 paid hours a week. The men will have to report to the Board's labour offices and hold themselves available for work each day. If they are not given work on any day, they will still receive their regular pay. Preference will be given to workers at present in registered gangs, a proportion of whom will be selected for the regular staff.

Registered workers not placed on the staff will be entitled, when sick, to continue to receive two free meals a day, and it is also hoped that all directly-employed labour will be housed in the Board's labourers' lines after registration has been completed. When working, the weekly-paid men will continue to draw pay at time rates (ordinary and overtime) as at present, and any make-up payment under the 48-hour week guarantee will be in addition to their actual earnings during the week, including overtime payment. All registered workers will also be entitled to paid holidays.

The scheme is expected to be in operation by the 1st August, when a bonus scheme for increased output and handling of cargo will also be introduced. This bonus will be in addition to present rates of pay.

It is to be hoped that these incentives to speed up production will have the desired effect, as before the war the workers handled 11 tons of cargo a gang-hour compared with the present rate of only about 8 tons. There is no question that this rate could be appreciably increased even under the present adverse conditions, which are chiefly due to the recent world war.

Thames Passenger Service.

As a result of the recommendations of a committee appointed by the Ministry of Transport to consider the possibility of relieving transport congestion in the London area, it was decided and announced in the press recently that a service of "Water Buses" would be run on the River Thames between the Tower of London and Putney, commencing on June 1st.

The Port of London Authority as Conservators of the River Thames are the owners of piers situated in the Thames at various sites between Canvey Island and Richmond.

The most important of them is the Landing Stage at Tilbury, a pontoon pier some 1,200 feet in length well known to overseas travellers to London as the place of disembarkation and embarkation of passengers from and to vessels of the Orient, P. & O., R.M.S.P. and other Steamship lines.

Other piers below Tower Bridge are now mostly concerned with the purely commercial work of the river, while those situated at the Tower of London, Westminster, Lambeth, Chelsea, Kew and the Richmond Landing Stage are almost wholly used by pleasure cruising launches during the summer months.

The Port of London Authority is collaborating with the Ministry of Transport by the construction, at a cost of £12,000, of two new piers at Charing Cross and at Putney.

The object of the new scheme is to provide a regular half-hourly service of 10½ knot Diesel engined launches owned and operated by a private firm, and each carrying 150 to 170 people which it is hoped will be patronised by travellers in the London area.

If the experiment, during the next six months proves to be successful, it is understood that additional piers may be built and the service extended to Hammersmith and down the lower reaches of the Thames.

A regular all the year round passenger service had been in operation on the Thames as long ago as 1816, serving a large number of piers, most of which have since been removed, the steamers being operated during some periods by private concerns or by the London County Council or their predecessors, but mostly, it is believed, at a loss financially.

The Ministry of Transport and the Port of London Authority are to be congratulated upon their efforts to use the River Thames to the best advantage and by enabling the public to become acquainted with this important highway of commerce to realise the part it plays in the prosperity of the Port of London and indeed of the Metropolis itself.

Naples: A Great Italian Port

An Account of its Past Struggles and Future Prospects

By P. MAZELLA, President of the Autonomous Administration of the Port.

Translated from the Italian.

Historical Notes

NAPLES began by being the chief maritime city of Italy linking the inland province of Campania with the hellenic Orient. It is a natural embayment, almost at the centre of the Gulf. It gave life to the City of Parthenopi, of Grecian origin, alongside which arose in the middle of the Fifth Century A.D. the new City of Naples.

The Romans attached great importance to the Port of Naples, above all as a base for their fleet in the Mediterranean war. The fortunes of the port under the Romans underwent successive changes dependent on the events of the epoch itself and on the wide commercial competition of the neighbouring port of Pozzuoli.

Damaged Silos, Villa del Popolo Berth.

With the fall of the Roman Government, the quays of the Port of Naples lost their activity and the harbour became the refuge of modest commercial craft and fishing vessels.

It flourished afresh under Byzantino rule, resuming its old function of landing place for Oriental traffic and numerous naval industries.

The flourishing Republic of Amalfi and the incursions of the Saracens brought fresh tribulation to the life of the port and city.

Nothing is left of the topography of this succession of Grecian rule to the Roman epoch. Remains which have been discovered cause it to be surmised that there were primeval mural works towards the western arm of the bay. The various ancient gates giving access to the harbours suggest the utilisation of a large part of the coast which to-day forms the harbour itself, notwithstanding that the shore was destitute of defence works and offered no security of anchorage. There remains, however, indications of the existence of a dock towards the western angle adjacent to the small breakwater constructed apparently in the second century A.D.

As with the Normans and the Suabiens in earlier times, the life of the harbour had to undergo the regrettable consequences of invasion and dominion, and then again to reflourish through the decline of Amalfi and of Pozzuoli, which no longer enjoyed the development of trade.

If at such an epoch, works were undertaken for the safety of the harbour, these had to conform above all to the requirements of the safety of the men of war, and only a small part of the works could be assigned to the improvement of the condition of mercantile traffic. However, in the port zone, now flourishing by trade, there was commenced the erection of warehouses for the Genoese merchants, the Peranians, the Marsellaise, the Provencials and the Florentines, the new works extending as far as the small embayment at Santa Lucia.

Under the Angevin rule (1266), Naples became the capital of a rich and prosperous kingdom. Charles of Angiers did not fail to restore the port activities, constructing new stores and wharves along a frontage towards the east of the harbocr (called the Moricino beach, opposite the present Carmino zone). Military storehouses were built near the dock, where a veritable arsenal came into being.

Eastern Shed Reconstructed at the Villa del Popolo Quay.

In 1291, Robert of Artois and the Cardinal Gerard de Palma gave an impulse to the repair and restoration of palisading for the enclosure works of the harbour and mooring chains for the ships of war in the arsenal area.

Under the successors of Charles I. of Angiers, notwithstanding the unfortunate War of the Vespers, the harbour was enlarged and protected and fitted with wharfing to the eastward of the Moricino zone. It is to the credit of Charles II. that in 1302 he undertook the reconstruction and widening of the harbour and arsenal. In fact, the perimeter was enlarged, the roadways paved, the wharves of the Little Mole reconstructed, and port taxes imposed to pay for them.

In 1334, the dock of the arsenal was enlarged with the addition of mooring piles. King Robert constructed also a second arsenal below Castelunovo, capable of accommodating 50 galleys. In 1344, notwithstanding violent storms and the shortage of materials for the work, the unequal struggle of man against nature could be said to be at an end.

Up to 1383, there is no further news of the Angevin port. It is, in fact, in this century that the layout of the port was moulded almost up to the present epoch. From Castelunovo to the Carmine, between moles, mounds of rubble and arsenals, lay the whole sequence of works, which accumulated and completed themselves with mercantile houses which found, at Naples, all the conveniences for their business.

After the dissipated reign of Giovanni and the consequence of the struggle against the Aragonese, the Port of Naples resumed its growth and its activity. A century later, Alphonso I., who

Port of Naples—continued

devoted much attention to the arsenal, widened the Great Mole (to the west), strengthening it with protective rock work of considerable mass and wide fortification on the mole itself. He executed other important works of maintenance to the quay, which was widened at the same period.

The first lighthouse was built in 1487, though later destroyed in conflict, and reconstructed in 1600 by the Aragonese during the period of their second dominion.

Nothing was done to the harbour during the Viceroyalty of Spain, while under the Austrian domination the only concern of the Bourbons was, from the outset, limited to the increase of naval shipyards for vessels of war. Thereafter King Charles devoted himself to the enlargement of the harbour. The whole extent of the shore-front from the arsenal to the Carmine benefited therefrom. The new mole was built which divided the arsenal

Duchess Ellen d'Aosta Pier—Western Side.

from the rest of the harbours for 900 palmi to the east of the lighthouse with an arm, protected by rock-work of great blocks, equipped with a small fort, battery and a small lighthouse. In the body of the breastwork was placed a statue of St. Gennaro, from which the mole took its name. Towards the north was constructed a wide quay. Large warehouses were built. Then the reconstruction of the Via del Piliero was proceeded with and the Marinella. The Little Mole was arranged (the old Immacolatella), connected to the other wharves of the Via Marina bridge. It was constructed there near the Tribunal della Salute, on which building was placed the Statue of the Immacolata.

There was a long interval of decline during the period of French dominion and the strict blockade of the English.

A new outbreak of port activity took place with the Bourbon Restoration.

During the reign of Ferdinand I., in 1838, a violent marine disturbance demonstrated the urgent need of correcting the defects of the harbour.

The Mercantile Marine advocated the extension of the St. Gennaro Mole with an arm of the mole to Martello. Instead, it was decided to lengthen the St. Vencergio Mole. The basin thus formed (between the St. Vencergio and the St. Gennaro Mole, called the Basin of the Beverello) had to serve for war vessels.

For the Mercantile Marine, was determined the construction of the new quay towards the east, called the Porta di Massa Quay.

In 1847, in consequence of notable studies and projects, there was designed a rubble extension to the arm of the St. Vincent Mole. The previously projected mole at Martello to St. Gennaro was built for protection from the easterly winds, and on this mole were constructed also imposing warehouses and a great outer wall as a defence from southerly winds.

Up to 1860 other surveys were made for the improvement of the harbour, without actual materialisation. But the development of naval architecture, which gave vessels of greater tonnage, necessitated the improvement and the enlargement of the Mercantile harbour.

The Mercantile harbour was comprised between the mole of the old Immacolatella, the Piliero Quay, Angivino Mole, the St. Gennaro Mole and the Mandrachio Basin.

The military harbour, on the other hand, was comprised between the two aforesaid moles and that of St. Vencergio, which constituted the true harbour and was bounded by the dock and the Molosiglio. Unfortunately, access to the Mercantile harbour was always dangerous in bad weather.

Under the first Italian kingdom more important works therefore were commenced, consisting of:

(a) The prolongation of the St. Vincent Mole for about 800 metres;
(b) The construction of a new Eastern Mole beyond the River Sebeto, leaving between its seaward boundary and St. Vincent an opening of 400 metres;
(c) The systematising of the new harbours with quays, docks and basins.

The St. Vincent Mole, by reason of violent seas, was extended by only 320 metres in 1883. Between 1881 and 1889 the quays were arranged and the construction of the large General Warehouses at St. Gennaro completed.

During 1883 the following works were continued:

(a) Towards the ultimate extension of 340 metres on the St. Vincent Mole;
(b) For the construction of the Eastern Mole at Martello and Curvilinio;
(c) For the construction of quays at Villa del Popolo, Porto Massa and the Trapezoidal Mole;
(d) For the construction of a railway line and connection with the Central Station.

Between 1889 and 1903 were executed works of equipment on the quays by means of the formation of rail tracks along the quays, the arrangement of squares, of sheds, and 4 cranes at Villa del Popolo; the installation of electric light and disinfecting stations; sheds at Porto Massa; a maritime station at the Trapezoidal Mole, and a building for emigrants.

Following lengthy studies, begun in 1883, were constructed the careening basins completed in 1905, and included in the work the extension of the Oriental Mole with a hammer head diversion and such as to protect a wide dock opposite the basins.

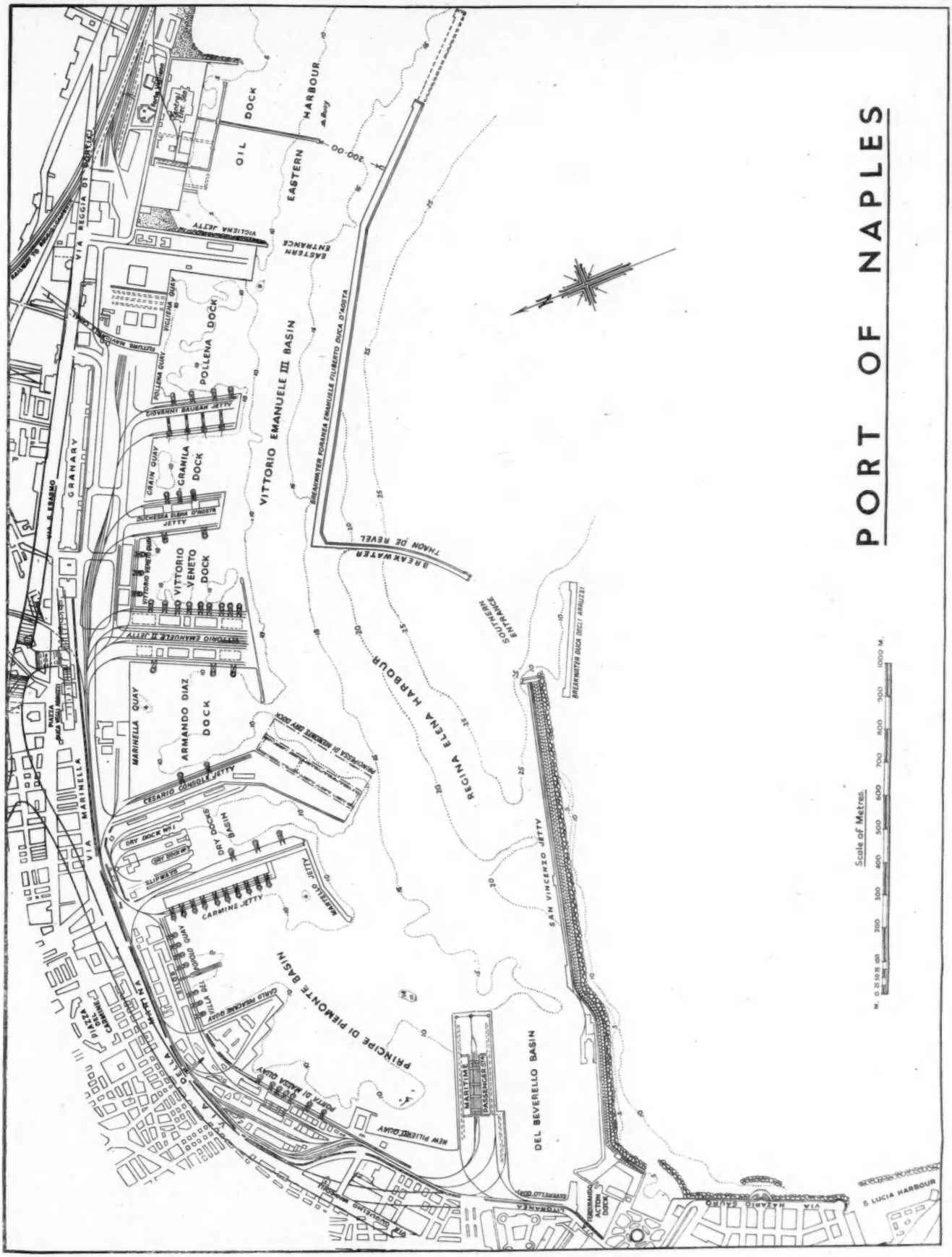
In the same period, improvements were contemplated, based on the extension of the St. Vincent Mole.

There were arranged at this period quays on the old rubble work called Vittovio Emanuele II, a curvilinear breakwater or antemurale with a length of 360 metres, with the object of protecting the harbour area from seas in the second quadrant. This breakwater did not have the desired effect, since it caused a strong reflex action through the passage of the libeccio (south west gale), in consequence of which there was studied a prolongation of the St. Vincenzio with a westerly deviation. This was in the year 1914. The war intervened, causing the suspension of all operations.

Between 1919 and 1920 many projects were put forward and authorised. They were as follows:

(1) The construction of a substructure at the mouth of the harbour;
(2) The prolongation of the outer breakwater;
(3) The formation of quayage between the Viglieno Wharf and the Central Wharf (then divided into two: Bausan and the Duchess d'Aosta) and the Granili Quay and the quay to the west of the Vittorio Emanuele Wharf;
(4) The construction of a three-storied warehouse with an area of 18,000 square metres;
(5) The supply of 33 cranes for the equipment of the quay;
(6) The widening of the Masaniello Mole;
(7) The construction of railway sidings, streets, foundations, etc.;
(8) The diversion of the River Pollena.

In the course of the execution of the foregoing works, which were begun between 1920 and 1930, others were examined, including three considerable undertakings consisting of the construction of a third large swinging basin in the outer part of the dock, an adequate passenger station, with a great new mole

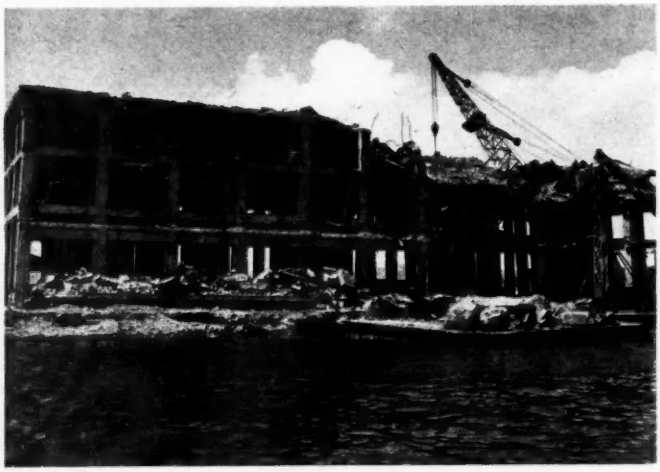

PORT OF NAPLES
OIL DOCK
EASTERN HARBOUR
EASTERN ENTRANCE
VICTORIA JETTY
VICTORIA QUAY
POLLENA DOCK
POLLENA QUAY
GIOVANNI BAUSAN JETTY
GRANARY
GRANILA DOCK
GRAIN QUAY
DUCHESSA ELENA D'AOSTA JETTY
VITTORIO EMANUELE III BASIN
BREAKWATER DORIANEA EMANUELE FILIBERTO DUCA D'AOSTA
THAON DE REVEL
BREAK WATER
VITTORIO VENETO DOCK
VITTORIO VENETO QUAY
VITTORIO EMANUELE III JETTY
SOUTHERN ENTRANCE
REGINA ELENA HARBOUR
BREAKWATER DUCA DEGLI ABRUZZI
ARMANDO DIAZ DOCK
MARINELLA QUAY
CESARIO CONSOLE JETTY
DRY DOCK No 1
DRY DOCK No 2
DRY DOCKS BASIN
SLIPWAYS
MARINELLA JETTY
CARMINE JETTY
SAN VINCENZO JETTY
PRINCIPE DI PIEDMONTE BASIN
CARMINE QUAY
VILLA DEL POPOLO
CARMINE PIAZZA
PORTA DI MASSA QUAY
NEW PILLERET QUAY
MARITIME PASSENGER STA
DEL BEVERELLO BASIN
BEVERELLO QUAY
FLORIDIANA DOCK
VIA MARINELLA
VIA REGGIA DI PORTICI
VIA NAZARIO SAURO
S. LUCIA HARBOUR
Scale of Metres
M. 0 25 50 75 100 200 300 400 500 600 700 800 900 1000 M.

Port of Naples—continued

branching from St. Gennaro and the industrial port, Baia Averno. Though this last project was abandoned, the other three were started without delay.

The completion of the Angioina Mole (springing from the root of the St. Gennaro and Angioina Moles) and the great maritime station were brought to a conclusion between 1932 and 1936. The work on the great basin, on the other hand, had to be suspended on account of the Great War in 1940.

In the meantime the Port of Naples, protected by a new external breakwater to the south-west of St. Vincenzio, was enriched by numerous other constructions appertaining to warehousing, customs, police barracks, docks, silos, mechanical appliances, workmen's dwellings for dockers, and other works with a social background.



General Warehouses, Vittorio Emanuele II. Pier.

The 1940-45 war brought cruel destruction. At the beginning of 1944, the Port of Naples was completely devastated by the effect of the shattering bombardment of the three preceding years. The Allied Military Forces for about two years had made use of the harbour continuously without the payment of a single penny or the repair of a single quay.

Towards the middle of 1945, the gradual liberation of the port zone found the Administration of Public Works ready, and private initiative prepared for the reconstruction of works and the repair of damage.

In 1947 all the works in the whole of the port zone showed signs of new life. The work on the great swinging basin was resumed. Corporations and private firms rebuilt warehouses, silos and cold stores. The maritime station, almost totally destroyed, was reconstructed. Enlargement plans of the port zone development were put in hand. The reconstruction programme proceeded in the confidence that this great harbour, before long, in an era of secure peace, would resume its full activity, taking as its example for the future its old and glorious traditions.

Traffic at the Port of Naples

To obtain a fair valuation of the part played by the Port of Naples in the economic life of Italy it is necessary to examine the statistics of the mercantile traffic during the years immediately preceding the outbreak of the last Great War.

A comprehensive glance at the statistics of maritime activity shows that in the said period the Port of Naples had not only maintained but surpassed its old-time peak as a typical cosmopolitan passenger port and a centre of tourist activity of the first order.

In 1930, the number of travellers embarked and disembarked in the Port of Naples (exclusive of tourists) surpassed the million mark and maintained itself at that level through the succeeding years till 1935, to be increased in 1936 and 1937, reaching the maximum in 1938 with a total of 1,416,633, a figure never equalled since the beginning of the century. This increase has partly to be put in relation to the intensity of passenger traffic exhibited at the port in consequence of the new function it had assumed as an Imperial Port, as it was termed after the Ethiopian conquest. From an examination of the data attaching to the principal traffic routes, one notes that the trade to and from the colonies records a great increase in the period in question, passing from an average of about 13,000 in the year 1930 to 146,680 in 1938.

In its new function, the Port of Naples demonstrated that it possessed all the requisites needed to respond with confidence to the modern heavy demands of the traffic.

The importance of Naples as a passenger port has also been proved by the fact that, in 1930, it absorbed about 26 per cent. of national navigation with foreign countries, distributed as follows:—

	per cent.
North America	71.53
South America	6.39
Ports outside the Mediterranean in Asia, Africa and Australia	7.12
Mediterranean ports of Asia and Africa ...	7.91
European ports outside the Mediterranean ...	1.85
European Mediterranean ports	5.20

In the succeeding years there was to be noted, however, a marked tendency to a reduction in the volume of passenger traffic abroad, and having passed in the period comprised between 1930 and 1938 from 121,000 to 93,000. In 1939 it contracted further down to 62,000 total, perhaps by reason of the new impending menace to the world on the eve of the great conflict. There is to be noted further a characteristic deviation in the principal currents of traffic with foreign countries. There was, in fact, a gradual displacement from North America, which formerly absorbed the greater percentage of the movement towards South America, and especially towards the East, with the result shown in the following figures relative to the year 1936:—

	per cent.
Traffic to North America	55.43
,, ,, South America	12.43
,, ,, ports outside the Mediterranean in Asia, Africa and Australia ...	8.01
,, ,, Mediterranean ports of Asia and Africa	13.70
,, ,, European Mediterranean ports ...	9.38

The traffic from and to the colonies maintained a constant increase indicative of the new policy of Mediterranean expansion pursued in the past regime, and served to justify in other times many optimistic previsions on the future development and the future possibilities of the Port of Naples.

Also the tourist movement contributed an important figure to the total volume of traffic through the Port of Naples.

The number of tourists in transit recorded a constant increase, rising from 7,738 in 1923 to 20,614 in 1928 and to 59,640 in 1934, reaching still higher figures in succeeding years.

This great increase is to be noted only in the section of passenger traffic where the new equipment proved adequate to the new and more exacting requirements of the work. In the sector of goods movement, the realisation of works of adequate enlargement and increased capacity of the equipment and service hoped for by the departed regime had not produced the results desired and awaited. The total volume of traffic in imports and exports did not show an adequate appreciable increase in value, which in 1938 exceeded only by a little the mean of the years preceding the outbreak of the first world war: 2,800,000 tons of goods entered and despatched, or thereabouts. This goes to show that it is not always the higher efficiency of a port equipment which suffices by itself to compensate for the lack of those natural conditions which alone strongly stimulate the functional economic activity of the port and its hinterland.

Exports, always greatly inferior to imports, were generally limited to products of the soil and of agricultural industry, that is to say, in a large measure fruit, potatoes, feeding stuffs, hemp, textiles, cereals, preserves. These last had always an important place in the exportation movement, with a figure reaching 82,000 tons in the year 1937, indicative of one of the most typical and vital industrial activities of the region.

These exports, however, in the quinquennium between 1933 and 1938 showed a decided tendency to contract and were

Port of Naples—continued

largely influenced by the political autocracy of the late regime, especially in comparison with hemp and cereals. This result is confirmed by an examination of the statistics relative to the more important channels of traffic, which give the following data:—

	To North America	To England	To the British Indies and the Netherlands
1933 ...	60,317 tons	56,936 tons	12,728 tons
1938 ...	40,212 tons	26,083 tons	11,650 tons

Vittorio Emanuele II. Pier—Western Side.

There was, however, an improvement in the exports to Germany, the amount of which was raised from 4,531 tons in 1933 to 9,553 tons in 1938.

Also in the traffic with our external colonies there was in the same period a very pronounced accentuation in the export figures, which increased from 16,529 tons to about 169,000 tons. The greatest amount was in the years 1935 and 1936, and it was the natural outcome in almost every respect, of the heavy demands of produce and materials required for the war in Ethiopea.

Furthermore, certain tendencies of export traffic, such as preserves of fruit and of food manifested themselves in an exchange, losing completely the Russian market and those of other countries of the European and extra-European Orient, most likely through the Japanese competition, which in this period became even more active and successful.

In the division of importations, it can be said that the external movement—and that is of great significance—remained stationary in the last pre war period. The slight increase recorded in the volume of imports (1,969,620 in 1938 in comparison with 1,609,498 in 1933) is more due to the increase of the local population and the constant gradual improvement of their manner of life than for economical reasons. Among the principal material of the import traffic from abroad with the Port of Naples may be mentioned the following:—Solid and liquid combustibles (coal, naphtha, benzine and petroleum), grain, dried fish, cereals, cellulose, timber, chemical products, metals, foodstuffs of various kinds. The combustibles represent a high percentage, almost 69 per cent. in the total movement of imports and 56 per cent. in the total port traffic, imports and exports.

A very significant indication of the tendency shown in the flow of import traffic due to a change of economic policy—internal and external—in the years immediately preceding the war can be gathered from a comparison of the following relevant statistics at the middle of the quinquennium 1910-14 with those of successive periods:—

Nature ot Goods	1910-14	1923-27	1928-32	1932-37	1938
Combustible Oils ...	34,200	73,000	305,000	582,300	687,296
Coal	864,000	652,000	576,000	568,000	678,548
Cellulose	8,600	—	13,000	21,000	24,218
Grain, cereals, timber	431,400	557,900	472,000	242,500	152,828

The imposing increase in importance of mineral oils is shown in strict relationship to the change required in industry and to the installation in the outer zone of the harbour of petroleum refineries, one of the most important and best equipped in Europe; while the contraction shown in the imports of grain and cereals speaks eloquently of the effect on the country of the national autocracy.

On the eve of the outbreak of hostilities, everything foreshadowed that Naples would have continued to assert even more worthily its duty as a port devoted specially to traffic with the colonies, while it was hoped that the intensification of the imports of combustible liquids would lead to a study of important projects of improvement for the port basins and for the equipment of loading and discharging.

Traffic of the Port of Naples in the Years Succeeding the War

The Italian economic situation is still too confused and the international political situation still too uncertain to make any reliable prophecy on the future of the port and of its immediate concrete possibilities of life and expansion after the enormous devastation caused by the war. One can, however, assert that already the signs of renascence are to be seen, while there are in progress works for the restoration of the harbour to a condition adequate for the solution of its obligations.

There have already been resumed regular traffic lines with Sicily and Sardinia. Already we have renewed traffic with foreign Mediterranean ports of the Middle East, those of the Red Sea, and with North and South America.

To-day the traffic shows the prevalence of goods in bulk (grain and coal) which flow into the port in great quantities through the necessity imposed by the special requirements of the moment.

Passenger traffic has responded in its turn to the notable movement which, up to a few months ago, was occasioned by the repatriation of political prisoners or the return of fugitives from occupied territories.

There has to be dealt with a movement of extraordinary character, which cannot be accepted as an indication of a normal or stable state.

Clearing War Damage at Vittorio Emanuele II. Pier—Eastern Side.

In 1946, there were recorded the following data:—

Passengers embarked or disembarked: Total 799,764, of whom 404,370 arrived and 395,394 departed.

The movement of goods has shown a total of 1,907,064 tons, of which 1,372,377 arrived and 534,687 were exported.

Of the total imports (1,372,377 tons), 1,260,371 tons were from external sources, represented as follows: benzine, naphtha, petroleum, coal, grain, cereals and various merchandise.

Exports were limited to small consignments of various goods, alimentary preserves and combustibles, directed to other Italian ports.

Studies of Harbour Borers

By ERIC HARDY, F.Z.S.

Of the several marine borers that interfere with harbour wood and stonework, few cause more trouble than the teredo or "ship-worm" and the pholas or date-shell. When I was in Plymouth recently, I was interested to learn how the boring sponge *(Cliona celata)* occurs in the limestone blocks which form the Plymouth Breakwater, thus helping their destruction. These animals have all been the subject of special investigations, with much practical information gained thereby.

The boring sponge grows into large cheese-like yellow masses on the sandstone rocks off the West Country and the North-West, but it is a creature of two forms, the other type excavating a net-work of galleries and tunnels in oyster-shells or in soft rocks, and in the course of time the rock thus perforated crumbles away, exposing deep layers to the sponge's ravages.

This is an interesting animal because it has two varieties, one the massive type described above, and the other the boring or sinuous type. The latter form can eventually become the massive form, according to growing conditions. From a collection of specimens in the Liverpool area, it is plainly to be seen how there are gradations of every variety of form, from the form boring shells or stones with small circular holes, through various stages during which the shell becomes more and more perforated and the sponge grows over it, surrounds it and encloses it, until it reaches the massive form. In the Dee mouth at Hilbre Island recently, I collected at low tide a pale yellow specimen nearly a foot long and 6 inches wide.

In various parts of the world large bi-valve molluscs like Bankia, Martesia and the latter's relative Pholas (the "date shell" or paddock) bore into wood and soft stone in estuaries, and boring trouble is sometimes caused by three crustaceans called Limnoria (the tiny grey "gribble"), Chelura and Sphaeroma. Martesia infestation may occasionally arise through currents washing up driftwood infested with the borer, and by log-booms in war-time; the salinity of the local water and other factors influence the breeding cycle. Martesia will live up river if salinity of 5 parts per 1,000 occurs only one day in 30. Limnoria and Bankia require higher salinity, at least 20 parts per 1,000. They will also attack timber in badly polluted estuaries where ship-worms and pholas shells don't normally live. In 1921, Limnoria caused serious damage to the Douglas fir piles in San Francisco harbour, but 80% of the damage was encouraged by the careless driving of pile dogs, the holes not having been plugged after the piles were drawn, and 15½% of the damage originated in checks started during or after driving. The Lacora barnacle merely cements itself harmlessly to a ship's sides, but by a long, soft wormy part, the ship's-barnacle bores into a vessel's timbers and does much damage.

Probably the most serious, universal damage is caused by the so-called ship-worm, molluscs named *Teredo nivalis, Bankia setacea,* etc., and freshwater relatives *Neoteredo reynei,* which damaged greenheart timbers in the Saramacca Canal, and *Nmiraflora* and *Neobankia zeteki,* which have damaged green-heart in the Panama Canal. Greenheart is, however, the most resistant timber to these borers, and the next best is Burmese pyinkado or pyingado. Some interesting studies of the control of teredoes has been carried out by the Fisheries Research Board of Canada in recent years. In British Columbia waters, where copper and white marine paint and explosives are used to protect fixed or floating timbers, Neave has studied the seasonal settle-ment of shipworm larvae. Adult shipworms do not, of course, migrate from one timber to another; it is the free-swimming larvae form which starts the infection after the adult has discharged its eggs into the water.

Several stations for the study of this problem were established on the coast of Vancouver Island and test blocks of fir wood were immersed at three different levels: at zero tide, some 4 to 8 feet above this and 3 feet above bottom, and 3 feet below the surface by suspension from a float. While the heaviest outbreaks of damage in these waters seem to occur from August to January, no season of the year could be regarded free from attack, so that such measures as paint and explosive treatment, whose effects are not permanent, have to be continuous. No close relation could be noticed between water temperatures and salinity, and their influence on the breeding of the shipworms. In Departure Bay, the maximum monthly settlement of shipworm larvae on the timber samples was in November, next August-September, and third October; least was in May, June, February, March, April and December. Maximum at Ladysmith was in June and October, and at Cowichan Bay in September. At Comox, the maximum was in December and January. The sample blocks were exposed to the water for periods from one to three months, when a fresh sample was substituted on their removal. Although it is held that new infestation by shipworms occurs in spring and autumn, the experiments failed to reveal any regularity of the spring peak period, and spring in the majority of cases was a period of low rate of infestation, compared with late autumn. At the Departure Bay experiments, there was at least some infestation during every month of the year.

At the Atlantic Biological Station at St. Andrews, New Brunswick, Needler has developed a cheap protection for wood against shipworms by using a mixture of tar and copper oleate with a suitable solvent like kerosene or benzol, as a substitute for the more expensive copper paint, long used as a standard and effective protection in warm waters. The cheapest form was made in the proportion of 1 lb. of copper oleate dissolved in half a gallon of kerosene and the solution mixed with a gallon of ordinary seine tar. The effectiveness of these paints depends upon maintaining an unbroken thick coating over the entire surface of the wood and allowing it to dry and harden thoroughly, for enough ship-worms can enter a gap of only a square inch to destroy two board feet of timber. This preparation is applied cold, by brush, in two coats, while rough timber may be dipped in it. Blistering during drying must, of course, be avoided, and the wood must be well fendered against chafing after return to the water. But these precautions are required for copper paint and other anti-shipworm paints, although deep penetration of creosote by pressure stands up to chafing well. Creosote applied by dipping or brushing is useless, while tar solutions are not reliable without containing copper oleate.

The use of dynamite in Teredo infestation of wharf piling, dolphins, breakwaters, floats and of ships' bottoms was apparently originated from the fact that at Port Angeles, Washington, U.S.A., pile-drivers some years ago noticed the destruction of shipworms by the concussion produced by the pile driver hammers. The Atlas Powder Company found that even untreated piling could be used with safety if what they called "teredo shooting" were commenced within three months of the piles being driven, and then the piles were given successive "shots" at three-months intervals for the first year, after which annual "shoots" were sufficient. Logging companies in British Columbia have adopted this system with success. Piling and dolphins are protected from the pests by discharging six or seven sticks of 60% dynamite three or four feet from where the pile enters the mud and seven or eight feet from the pile. A series of charges is considered more effective than a single blast. Three or four sticks are submerged as deeply as possible below floats to be treated, and then set off. In Lady-smith harbour, dynamite-treated piling, subjected to considerable strain, was still sound after five years, but untreated piling required replacing after three years. The practice in British Columbia is to have monthly dynamite "shoots" to kill the young teredos before they have time to penetrate far into the wood. Of course, consideration must be made for the effect of such explosives upon commercial fisheries and shellfish beds in the vicinity; we all know how the beaches were littered with dead fish after D Day.

There is very little damage from shipworms in the highly polluted harbour waters at Liverpool and Birkenhead, and nothing more than gas-tar protection is necessary for submerged green-heart dock gates. Most shipworms thrive greatest in deep water, but *Bankia setacea,* a pest on the Pacific Coast of N. America, thrives best in colder water, and Limnoria is most active between tide levels. When I visited the Palestine Potash Coy. piers at the north and south ends of the Dead Sea, borers were totally absent.

Studies of Harbour Borers—continued

The speed of destruction by some shipworms under suitable conditions is very great. In about two months or so, after its summer breeding season arrival as larvae, the common Teredo can destroy unprotected piling, burrowing at a speed of up to 5.7 cm. per month, or an average of 3.5 cm. when 2½ months old, 4.5 cm. when 3½ months old, and 2.2 cm. when two years old. Bankia shells, on the other hand, bore at the rate of over 11 cm. a month when 3½ months old, the age of their greatest activity. No wonder one can rasp its way into the mud-level of untreated Douglas fir and other piles and destroy them in five or six months. And when it is recollected that as many as 15,000 teredoes have been counted in one pile, and each teredo can produce 2,000,000 free-swimming larvae capable of infecting other piles, the seriousness of the problem will be appreciated.

Owing to the leaching effect of the sea, chemical salts, however effective, require periodic renewal, and one of the best treatments in cold water still is a deep pressure penetration of hot creosote—providing this is not punctured by deep nails, etc., for the teredo larvae finds the smallest hole. Tar oils are also very good. Concrete or metal coverings are also effective remedies for submerged woodwork, but the concrete may be affected by the sulphates in the sea and unless soundly made will disintegrate, while borers will attack rust-impregnated wood around nuts and bolts. The only serviceable metal covering seems to be copper, which, if carefully applied, gives up to 20 years' protection. Changes in water level, mud-level, the erosion of mud beds by currents and ships' screws, each has its influence upon the distribution of the shipworm and the borer. The borers will on occasion bore through tar and asphalt covering, and chlorine treatments are too soon leached out to be effective.

The Development of the River Trent

Future Navigation Prospects

By JAMES HARRISON, M.P.

It has been stated during the recent discussions on Inland Waterways, that the Trent Navigation is one of the best that has been taken over by the British Transport Commission, and there is no doubt that in comparison with other waterways in the United Kingdom, the River Trent is in a good navigable condition. During the last two years, considerable strides have been made to regain the pre-war volume of traffic, in flour, petrol, fertilisers, pipes and other products, and this comparatively happy position, gives considerable satisfaction to those people who have interested themselves in water transport, in the West and East Midlands. Comparisons are, however, limited to what existed before the war, and to the present tonnage carried on other rivers and canals, and when one recognises the rather sad fate of some of these, such comparisons lose much of their value as yard-sticks to future development.

A brief glance at the general transport facilities in the area (which includes the towns of Birmingham, Leicester, Derby, Nottingham, Newark, Gainsborough, Lincoln, Sheffield and Scunthorpe) will reveal that, whilst road and rail routes north to south are excellent, the facilities west to east are not as good, and the rail routes are definitely bad. When one considers the vast populations and industrial plants included in the area—the greatest inland concentration in the British Isles—it is easy to realise the enormous potentialities of any scheme that promises to link up cheaply and efficiently these towns with the sea.

The Chamberlain Committee of 1921, made a detailed examination of the possibilities of inland waterways and in their nation-wide survey they concluded that the Trent System offered the greatest possibilities. This committee concluded that the two major obstacles to the development of the Trent, was the lack of unified responsibility for the river and the diverse interests responsible for navigation. The latter hindrance has now been removed by the vesting of the navigation in the British Transport Commission and the former will be eliminated when the Rivers Boards Bill becomes law.

Since the publication of the Chamberlain Report, there have been revolutionary changes in the facilities employed in water transport operations. These include the development of the Diesel engine, which may contribute as much to the river as it has done to other forms of transport, the modern and improved methods of shallow draft boat construction, automatic loading and unloading devices, and wireless aids to small boat navigation. All these make the management of inland waterways considerably easier than hitherto, and any proposal for the extension of traffic becomes far more important and more reasonable, as a really competitive form of transport, than ever before.

In the present proposals any extensive development of the existing narrow canals is not contemplated, they can still be used as feeders to the river system.

The Hull to Birmingham River Route would be approximately 150 miles long and it is visualised that boats with a carrying capacity of 500 tons would navigate to Nottingham, and from there to the water-head, the present Trent Standard craft of 140 tons would be used. That is the main idea, and for some time now, a lot of the improvements to the river, whether it has been navigation or flood prevention work, has been designed with the above developments in mind.

Of necessity, certain of the detailed recommendations in the scheme will have to remain vague, not because they have not been worked out, but to prevent speculation in land and river frontages. At the present time sea-going vessels of 500 tons can come up to Gainsborough. Beyond that point and as far as Nottingham, the Trent Standard Craft has a carrying capacity of 140 tons. The newer locks from the Humber to Nottingham have been constructed to pass at one operation, a single boat carrying 250 tons or a power boat and three dumb barges of standard dimensions which gives a total carrying weight of 500 tons.

Experience has shown that the stretch of the river from Nottingham to Birmingham will not attract to the same degree, the mass of traffic that the lower stretches do, so the proposal for this stretch is that part of the river shall be deepened and the standard for locks and bridges shall be designed to take the present standard craft of 140 tons, which would mean a 15-ft. lock width, a 7-ft. river depth and a 10-ft. bridge clearance.

To ensure the necessary depth of water in times of drought, the tapping of extra supplies in the upper reaches of the river, with its tributaries, could be fairly easily accomplished. There would be good supplies of water to Burton-on-Trent and it is suggested that the river route should be followed more closely than was suggested by the Royal Commission whose plan was to use the Trent and Mersey Canal and so carry the navigation via Shardlow, Kings Mill and Swarkestone and on to Burton. Keeping to the river through Nottingham, and following the river from Shardlow to Burton, would be alternative to this. It is interesting to note that from early times this stretch of water has been regarded as navigable, for in 1700, powers were granted to Lord Paget to collect tolls and improve the navigation on that part of the river.

Owing to the steep gradient into the City of Birmingham, it would be advisable to seek a water-head some distance from the town and several ideal spots offer themselves for this purpose. The necessity for lifting the traffic to the city would be avoided, and whilst the goods would have to be sent by lorry or by the present narrow canals, the arrangements would not be unduly inconvenient, for the few extra miles would be offset by the added availability of land for improving the loading and unloading facilities.

Quite a lot of preliminary surveying work has been done in connection with the above plan, and the details have been tabulated. There is no question that the country has an industrial concentration in the Midlands that would supply sufficient traffic to make the scheme an economic success. As already stated, the major obstacles to the project are being resolved by Parliament, that is multiplicity of ownership and diversity of authority for river maintenance and navigation. In addition there has to be considered the notable technical improvements of recent times, and taking all things together, the project seems worthy of the fullest investigation.

The Association of Sea and Air Port Health Authorities of the British Isles

The forty-ninth annual conference of the Association of Sea and Air Port Health Authorities of the British Isles was held at Swansea on May 12th, 13th and 14th, under the Presidency of Councillor W. Evans, Chairman of the Swansea Port Health Committee. Delegates were welcomed by the Mayor, Councillor Sir William Jenkins, J.P.

At the annual general meeting held on the first morning of the Conference, Alderman T. F. Mooney, of Newport, was elected as the President for the year 1948-49. Dr. H. C. Maurice Williams, O.B.E., Southampton, was re-elected Hon. Secretary, and Dr. W. M. Frazer, O.B.E., Liverpool, was re-elected Hon. Treasurer.

To mark the Association's fiftieth jubilee, Dr. Nicolas Gebbie, Port Medical Officer to the Hull and Goole Port Health Authority, gave an address entitled " The Romance of the Port Health Service and of its Association."

Dr. Gebbie said that the idea of forming the Association was conceived by the Hull and Goole Port Authority, which, with other Authorities, realised that concerted action was needed to safeguard the health of seafarers. He dealt with the work carried out by port health authorities in their constant vigilance to prevent the introduction of infectious diseases from overseas, and stressed the importance to this country of shipping, and the need for uninterrupted communication with other countries. He also reminded the Conference that a further problem had developed during recent years, namely, the prevention of the introduction of infectious disease by air traffic.

Mr. C. P. Heywood, Disinfestation Officer to the Swansea Corporation, read a paper on " Disinfestation of Ships and Cargoes." He described how pest destruction on ships was necessary not only to safeguard directly the health of passengers and persons on shore, but also to prevent damage to foodstuffs. International agreement in 1926 on the measures to be adopted had considerably reduced rat infestation on ships. The recent war stimulated economy of foodstuffs and the control of food pests.

Dr. R. Barrett, of the Ministry of Health, read a paper on " The Egyptian cholera outbreak, 1947, and its effects on civil aviation." He observed that Egypt had suffered two epidemics of cholera in the past century. The first in 1942 resulted in 34,000 deaths in a population of 5 millions. This epidemic was traced to the clandestine return of pilgrims from Mecca. Egypt had always been a centre of international sea and land traffic, and is now also an important centre of air traffic. Air routes radiate from Cairo to all parts of Europe, Asia and the Far East, Australia, New Zealand, Africa and North and South America.

For climatic and economic reasons Egypt is a country where at certain seasons cholera can develop in epidemic form. The sudden re-appearance of cholera in 1947 after an interval of 47 years caused considerable anxiety, particularly in countries having inadequate sanitation. The 1947 epidemic was of peculiar interest as a test for the International Sanitary Conventions of 1933-44.

This epidemic appeared to have no connection with the Mecca pilgrimage. The first cases were notified as food poisoning and occurred in a native village with a primitive sewage system and a water supply that came from a shallow well. The main occupation of the inhabitants consisted of cultivating dates, pressing them into cakes, and selling them to other villages in Lower Egypt. In spite of immediate precautions, the disease spread to the neighbouring villages and provinces, until all the provinces in Upper and Lower Egypt, with one exception, were reporting cholera cases. By the 14th November there was evidence of a marked decline. The last case was reported on the 31st December, and six weeks later Egypt declared herself free from cholera. The total number of deaths in the outbreak was 10,383 in a population of 10 million.

It is a significant fact that the disease did not get a hold in any of the cities where water supplies and sewage systems were of modern design. The Egyptian Government took elaborate precautions to prevent the epidemic from spreading.

Dr. Barrett stated that it was a matter for speculation whether the epidemic ended as a result of the seasonal drop in atmospheric humidity and drop in temperature, or whether it was due to the preventive measures introduced. This point was of considerable importance, because if it was due to a seasonal cause a recurrence of the outbreak may be expected in the Spring of this year.

Dr. Barrett said that the need for international agreement on measures for the sanitary control of aerial navigation was well demonstrated by this epidemic. In the Conventions the principal clauses dealing with cholera are:—

The incubation period of cholera has been agreed upon as five days.

Persons who have been inoculated against cholera less than six months and more than six days previously may be subjected to surveillance only.

The unloading of fish, shell fish, fruit and vegetables may be prohibited.

The World Health Organisation receives information of the spread of cholera.

An " infected area " in respect of cholera is one where the occurrence of new cases outside the immediate surroundings of the first case proves that the spread of the disease has not been confined to the place where it began.

Aircraft having a case of cholera on board must undergo medical inspection, isolation of the sick, and surveillance of passengers and crew for five days, disinfection of passenger effects and parts of the aircraft, the disinfection of the drinking water. Medical inspection of all passengers and crew, and surveillance for five days is prescribed for an aircraft from an infected area not having a case on board.

Only in one instance was a suspected case of cholera reported in an aircraft, at Darwin, and that was not confirmed bacteriologically. The only measures, therefore, that should have been imposed on any other aircraft or passengers were medical inspection and surveillance. In fact, during the time of the epidemics seven countries closed their frontiers to air traffic from Egypt. Another stopped air traffic to Egypt in order to have time to equip her air ports to deal with any cases of cholera. Others restricted air traffic to one airfield.

Dr. Barrett reminded the Conference that cholera inoculations did not provide absolute protection, and therefore inoculated passengers are still subject to surveillance under the Articles of the Conventions.

The procedure adopted for inoculation varied, some countries insisting on two inoculations, others requiring certificates to state the number of vibrios injected. Two countries insisted that all travellers from Egypt should be detained en route for a period of 7-8 days, and both these countries insisted upon negative stool examinations before entering.

The effects, therefore, on the air services during the time were severe, and it is noted that many of the countries introduced measures outside the scope of the requirements in the International Conventions.

Dr. Barrett pointed out that such difficulties did not normally arise in maritime traffic, and this is a problem for which both Governments and air lines will have to find a solution. He suggested that there should be a standard procedure of practice and that the vaccine should be standardised and recognised as in the case of yellow fever.

The problems should be dealt with in consultation between international bodies in charge of the responsibility for all health and aerial organisation.

During the Conference visits were made by delegates to several places of interest, including docks at Swansea and Port Talbot.

N. Ireland and United Kingdom Cargo Services.

Representatives of the Railway Executive, which operates the Belfast-Heysham service, and of the Belfast Steamship Company, Ltd., which operates the Belfast-Liverpool service, have reported that facilities for the shipment of cargo between Northern Ireland and Great Britain, have considerably improved and that the ships now in commission provide more space than is required for the amount of cargo being offered. The return of crates and empties has also been correspondingly improved. The problem of delays experienced by traders in the shipment of goods to England has been a matter of some concern during recent months.

The Port of Dublin

Reconstruction of Custom House Quay*

(Continued from page 10)

Excerpts from the Discussion

Mr. J. Mallagh (Past President), proposing the vote of thanks said that Mr. Bond had given an excellent explanation of the progress of the work. He himself, he said, had had some little experience of that difficult spot at the North Wall and from that knowledge he would like to express his admiration for the way in which Mr. Bond had surmounted all the difficulties he had encountered.

Mr. N. O'Dwyer (Past President), seconding, said that for the past 100 years the Institution had been receiving good papers from Chief Engineers of the Dublin Port and Docks Board and it was gratifying to know that this source of supply was still at the disposal of the Institution. He would like to congratulate Mr. Bond on his courage and the skill with which he had tackled a difficult job at a time when necessary materials were unobtainable.

Mr. T. C. Courtney (Past President), said that the Paper would be a source of help and encouragement to young engineers. From it they would see the huge difficulties which Mr. Bond faced, and faced without much prospect of overcoming them. He had no really suitable timber for the walings. He had no petrol for the concrete mixers. He had no timber for a staging and then the dredger he was using for the purpose was sunk. All those difficulties were faced and overcome with enormous courage. As a result of Mr. Bond's work, he had provided his successors with a structure which would not have cast iron piles ending up like graphite or timber piles finishing up as splinters.

Mr. R. Maguire (Member), said that some years ago he was working for contractors carrying out works on behalf of the New York Port Authority. He had always dreaded the job of reconstructing old docks because an engineer never knew what he was up against when dealing with them. The Dublin job, as Mr. Bond had admitted, was an orthodox one. If the ground was fine sand, or if it was a case of the exact closing of a cofferdam around the site of a building, the job would be a bit difficult. He had in mind the extremes to which engineers in the U.S.A. went with the preparatory work in the setting up of steel sheet piling. That was the preliminary framework before ever a pile was driven. Larssen piling could be twisted but there were certain types of piles that could not be. In the closed geometric cofferdam, where everything must be sealed, the engineer was the all-important man on the job. Skilled piling gangs would not drive a pile unless they had implicit confidence in the engineer who set up the corner piles. They must be in a dead line—dead on with a theodolite, squared every way.

He had thought to hear from Mr. Bond some indication of how the piles were started to be driven. The back set of piles was driven first. Was there a trench dug with the waler set in it? If so, that waler should be fixed in the trench and back braced to another waler in the trench. That would be a kicker against which the pile would be driven. Every pile which was driven must be checked with a carpenter's spirit level and lined up with the theodolite at all times.

Mr. J. B. Kearney said that when he was first associated with the Port and Docks Board they had not the advantage of sheet piles that fitted into each other. Driving piles was a difficult job with the materials then at the disposal of engineers. Mr. Maguire must have had very soft sand to work in in New York if he was able to put a spirit level on the piles.

Mr. **Warren Darley** said one could not criticise Mr. Bond's method because the whole thing was masterly improvisation. He would like to know from Mr. Bond what the section of the cast iron piling was. He had found a tapered pile, formed by splitting a pile and joining it with slotted bolt holes valuable for closing a cofferdam when piles had got out of plumb. For difficult extraction he had found a single-acting steam hammer arranged to deliver an upward blow very efficient.

Mr. Terence Mallagh (Member), said he was particularly interested in Mr. Bond's Paper as, when with the Clyde Navigation Trust, he was directly concerned with a very similar type of quay reconstruction, that at General Terminus Quay and Plantation Quay, Glasgow. The old walls at these quays were very like those of the Custom House Quay except that at Glasgow, many of the walls were founded on open crib work, supported on timber bearing piles.

As at Dublin, the new wharf line in places allowed the new construction to be built outside the existing structures, while for other sections the old and new work overlapped.

At Glasgow, for reconstruction work of this type, a method was adopted which became almost standardised for all gravity quay walls built in the river. For the sub-structure, this was a form of pocket construction and consisted in driving pockets or cells of sheet piling about 15-ft. by 20-ft., the back and sides being formed of steel sheet piling, and the front of 30-in. by 10-in. turpentine timber piles. These pockets were excavated to the requisite depth by grab and then filled with mass concrete deposited through the water by bottom-dumping skips. The timber sheet piling was left in and formed the permanent face of the substructures. The steel sheet piling was withdrawn as the concrete was placed, this being achieved by drawing the piles a foot or so before the concrete of each lift had set. The front timber piles were tied in only above low water, an artificial foreshore being formed by spoil as was done at the Custom House Quay. The steel piling required no strutting or fixing other than that given by the corner interlocks. The sub-structure concrete was brought to just above low water and the timber piles cut off at this level, their heads being secured to the concrete by wrought iron walings and bolts. The superstructure was formed by a stepped concrete wall built by tidal working. It will be appreciated that the steel sheet piling was only required for two sides of the first pocket; for subsequent pockets the previously concreted sub-structure formed one side.

This system, on account of its simplicity, cheapness and flexibility has much to commend it. One or more pockets can be worked at a time depending on availability of labour and plant and with a combination of tidal and non-tidal work labour can be employed most efficiently.

He thought that a modification of this method of construction could have been used with advantage for the Custom House Quay. Conditions for driving steel sheeting were probably on the whole, easier at Glasgow than at Dublin, although some boulder clay had to be contended with at Glasgow as well as at Dublin. In any event steel sheet piling was used at Dublin and in a cofferdam, where it was subjected to much more severe conditions than it would have been in " wet " pockets. War conditions would, of course, have ruled out turpentine timber sheeting, but this could, no doubt, have been overcome, possibly by building up an ample temporary foreshore and using temporary steel sheeting for the front as well as the back and sides of the pockets.

If the " pocket " system had been adopted, pumping and strutting of the cofferdam would have been eliminated and the vast quantity of shuttering that must have been used for the wall inside the cofferdam would not have been required. All this would have resulted in a big saving in timber.

At Glasgow, the fact that the new and the old work overlapped in places did not prevent the " pocket " system being used. The old walls were dismantled to just above low water in the ordinary way and the steel piles driven through the remainder of the masonry or concrete. One or other, or both of two expedients were used to allow this to be done; a special dolly pile, being a pile with a pointed and hardened toe, and/or steel wedge about 18-in. by 12-in. by 9-in. were first driven through the bottom courses. A special attachment was used so as to allow the McKiernan-Terry hammer to operate on the steel wedge. B.S.P. Section sheet piles, not Larssen, were employed and this former type pile is no doubt better for penetrating old masonry or concrete; it is, however, no better for use in boulder clay.

At Glasgow, although granite was available from the old walls as at Dublin, granolithic facing was used for the superstructure.

He was sorry that Mr. Bond was not able to give more data in

*A Paper read and discussed at an Ordinary General Meeting of the Institution of Civil Engineers of Ireland, held on March 1st, 1948, and reproduced by kind permission.

Port of Dublin—continued

regard to costs. The General Terminus and Plantation Quays reconstructed on the pocket system cost £186 per yd. for the sub-structure and £62 for the superstructure, this latter figure including all ancillaries such as paving, mooring bollards, rail tracks, etc., but not the shed. This gives a total figure of £83 per foot run against £75 (estimated) for the Custom House Quay, the former being for a 24-ft. berth and the latter 17-ft. If costs are taken as proportional to the square of the depths, the relative figures become £42 and £75. Even allowing for the difference in costs between 1932 when the Glasgow work was carried out, and 1939 when, he presumed, Mr. Bond's figure of £75 was estimated, the economic advantage of the pocket system appears to be confirmed.

He should perhaps add, that for one section of Plantation Quay the presence of very heavy boulder clay (which required blasting) prevented the pocket system being used. Pneumatic caissons were employed for this section and the cost of the sub-structure worked out at £404 per yard run.

He would be grateful if Mr. Bond would give some information in regard to the shuttering of the walls inside the cofferdam. With the very acute shortage of timber in Eire when this work was carried out the supply of the necessary material, even if " Metaforms " were used, must have been very difficult. Could Mr. Bond give some approximate figures for the cost of granite facing? In his experience, the cost of redressing and setting of masonry of this nature was nowadays prohibitive.

Mr. C. J. Buckley (Member) said that he had had little to do with the actual job, but he knew something about it, and he felt that Mr. Bond had understated some of the difficulties. The only new material which was purchased for the job and which was in reasonable supply was cement. Some of the shuttering used for the wall and for the shed was at least 25 years old, and had been used hundreds of times.

He was surprised that nobody had referred to the design of the transit shed. Normally a transit shed required a floor clear of stanchions which obstructed traffic and goods handling in the shed.

In this case, however, the shed had to be designed (a) so as to utilise the available materials and (b) so as to make the maximum use of the site area which was limited in width on the river side by the quay, which had to take portal cranes, and on the other side by the roadway on which it was not permitted to encroach. The provision of an upper deck for open storage of unbonded goods which would take no harm from weather more than compensated for the loss of floor space in the shed due to the presence of columns. The possibility was visualised of installing some form of transporter equipment by which goods, if necessary, be taken from the upper deck into the Custom House Docks, also the property of the Board.

Mr. P. G. O'Rourke (Member), said he would like to know what was the lifting capacity of the crane from which the extracting gear was suspended. A few years ago he had tried to extract staging piles with gear which weighed only two tons with a ten-ton lift. He eventually got two jacks which gave a pulling capacity of 100 tons and he got them out with that.

Mr. Bond had stated that under normal conditions he would use staging outside the cofferdam instead of the barge. With all the floating plant which the Port and Docks Board had at its disposal he would have thought that the staging would be the less economical method.

Mr. H. P. Clifton (Associate Member), said he would like information about the diameter and cost of the borings, if they were core borings and whether valuable information was obtained from them. Unless he had misunderstood Mr. Bond, the cement content in the concrete of the quay wall seemed very high.

As regards the transit shed he noticed that there was no obstruction on the roof longitudinally, and he would like to know how the passage of moisture from the roof to the shed beneath was prevented. The asphalt roof had to stand up to hard wear and he would like to know if the two layers were composed of different types of asphalt or was it intended to surface dress the top to enable it to stand up to the hard wear.

The President asked the author what was the weight of the concrete per cubic foot, what maximum size of aggregate he used in the concrete and had he any objection to using rich concrete on the face and low cement content concrete backing—three or four hundred lbs. of cement per cubic yard. Examination of the drawings suggested that the front toe was rather thin. Was there any reinforcing in that

Mr. Bond, replying, said that some of the speakers seemed to be under the impression that he had been solely responsible for this work. That was very far from being the case. The job was an example of team work, starting with the Board and working right down. Very valuable advice and experience were brought to the job by Mr. Kearney, without which, he doubted if they could have got through at all.

The answer to most of the queries put to him was that " It might be that it had to be that way." He would answer the questions in reverse order. The toe had to be shaped as it was to get it under the front waling and it was not reinforced because there was no reinforcing steel available. The reason for the richness of the concrete mix was that the aggregate was not graded but was gravel dredged from the river bed. Fortunately, there was sufficient cement and it was considered prudent to take no chances. In fact it proved an economy because it would have cost a lot more to buy aggregate than to get it out of the river. The answer to the question of varying the concrete grading between wall and face was somewhat similar. They had the cement. He had no objection to the use of different mixes where there were different stresses but in this case he did not think it was practicable and he rather doubted whether, in fact, it would have been economical. As regards the weight of concrete, he did not take any test cubes but it would run somewhere around 150 lbs. to the cubic foot. It was very dense concrete and very satisfactory waterproof.

Mr. Bond said he could not give much information as to the trial borings. They were core borings and as far as he could recall the diameter was 6-in. He could not recall the cost. The information obtained was useful in so far as it indicated the level of rock but apart from that he would say it was of no value whatever because the samples of boulder clay taken from the borings gave no indication of the rock-like hardness of the material when it was undisturbed.

As regards the shed roof, the reason for transferring all the load on to the longitudinal beams was that there was only enough reinforcement to reinforce in one direction. In fact, the arrangement gave little trouble. It was simply a matter of putting in one inch pieces of timber which were removed without difficulty. The asphalt in the two coats was similar and was a very slightly modified road asphalt. It had not had much trial on that particular shed but on another shed coated with the same asphalt there had been no trouble with leakage and it had stood up to traffic extremely well. As regards the expansion joints, no particular precautions were taken beyond ensuring that the joints in the concrete and the joints in the two layers of asphalt were staggered. The expansion joints were at very close intervals. There was a joint roughly every 20-ft. He had seen no sign of movement anywhere and no cracking or trace of leakage through the asphalt.

The crane used for extracting was nominally 7 tons, but that was not sufficient. The gross weight of the hammer and pile was approximately 5 tons which, theoretically, should leave sufficient margin, but they found that to get satisfactory extraction they had to apply a pull of the order of 12 tons with a floating shears.

As regards the jacking out of the piles, there were obvious difficulties in doing that when completely surrounded by water and, apart from that, the securing of the jacks to the piling was extremely difficult.

On the question of staging versus floating plant, Mr. O'Rourke had spoken glibly of all the floating plant at the disposal of the Port and Docks Board, little realising that the particular plant used would have been due for old age pension had there been anything to replace it and that it was wanted for three or four other jobs at the same time. He was not at all certain that floating plant at times would not be more economical than staging but it definitely lacked rigidity, particularly when pile driving. They had not the same control and sometimes in easterly winds they had to stop altogether, especially when placing concrete.

Mr. Bond said that Mr. Buckley had partially replied to Mr. Terence Mallagh's query as to the vast quantity of shuttering.

Port of Dublin—continued

Some of it in fact had been taken from an old shed and was 80 years old. No new timber was bought during the whole progress of the job. Three-inch deals were used instead of ordinary shuttering and these remained in use throughout the whole work.

He could not give a very accurate figure for the cost of granite, but he thought that the cost of buying dressed granite ready for setting worked out at approximately £1 per cubic foot, which would be, roughly speaking, £1 per square foot on the face of the wall. That did not include the actual setting. They found the cost of recovering and re-dressing the old granite substantially less than that.

He was not very clear as to the pocket system described by Mr. Terence Mallagh, but as far as he could make out the great virtue of it was that no pumping or strutting was required. In that case he did not quite follow how the excavation in Dublin could have been done at all because it was quite impossible to excavate under water. When Mr. Mallagh struck boulder clay in Glasgow he resorted to blasting. They would have been glad to blast in Dublin but no explosives were available. The Dublin clay was incredibly tough. He would sooner drive through masonry. There was no question of leaving the piling or timber in. It could not be spared.

Mr. Kearney, he said, referred to the cofferdams used in the early quay deepenings and to the fact that in those days the piling was never driven to foundation level and that they depended entirely on the foreshore for stopping leakage. He was afraid that in a number of cases on the present job they were equally dependent on the foreshore.

Mr. Bond said that Mr. Maguire had given an interesting picture of American practice but there was no necessity for anything as elaborate as that on the Dublin job because they were not making a completely closed cofferdam. Even if it had been a question of a closed cofferdam he was inclined to think that the system of cutting a pile and shaping it to the required width would probably be very much simpler because no matter how accurately one set out the piling it was a physical impossibility to ensure that every pile would go down without twisting. Even where the piles were in line at the upper waling it was found after excavating that the toes had been deflected in all directions.

Mr. E. W. Meckenzie (Associate Member) wrote that as he was familiar with the reconstruction work, which was carried out at Custom House Quay, and had prepared the working drawings to Mr. Bond's design for the quay wall, he disagreed with Mr. Terence Mallagh's remarks that the " pocket " system carried out at Plantation Quay, Glasgow, would be suitable at Custom House Quay. Mr. Mallagh stated that at Glasgow they were able to excavate by grab for the foundation of the wall; he did not think this would have been possible at Custom House Quay owing to the hardness of the boulder clay encountered. Mr. Mallagh admitted that when boulder clay was encountered at Glasgow the clay was loosened by blasting.

The majority of the work at Custom House Quay was carried out during the war period, and he doubted if the necessary explosives could have been obtained for blasting.

The cost of £42 per foot run for the wall at Glasgow compared with £75 per foot run (estimated) at Custom House Quay, was not a proper comparison, as Mr. Mallagh had only taken the square of the depths below low water, instead of the square of the depth for the total depths of the quay walls.

The total depth of the quay wall at Custom House Quay is 39 feet, and if the wall at Glasgow was 7-ft. deeper giving a total depth of 46-ft., the cost of the Glasgow wall would work out just under £60 per foot run.

The rates of wages and cost of materials were considerably lower in Glasgow in 1932, than those prevailing in Dublin in 1939, and when this is taken into account the relative costs are much closer. He did not think that, for computing relative costs, the square of the depth should be always taken, as this method should only be used when the sections of the walls were similar.

Baltic Mercantile and Shipping Exchange

Inauguration of Air Freight Section

The problems facing air transport to-day are analagous to those which faced shipping in the past. They will best be solved by using shipping practice as a pattern.

Shipping divides itself into two categories, viz., liner and tramp. Virtually these are two separate industries having different commercial machinery for their operation, but, on the other hand, in relation to overseas trade development, they have worked in collaboration for two centuries. There is some truth in the statement that ships follow the trade, but there is much more truth in the assertion that the trade follows the ship, or, in other words, that communications develope trade.

The commercial machinery of the liners is that of their booking offices for passengers and freight at their terminal and intermediate ports and important industrial centres all over the world. In addition to their own offices, they use the travel agencies and forwarding agencies. The commercial machinery for the tramps is something entirely different and in the main its venue is the Baltic Shipping Exchange, St. Mary Axe, London. The " raison d'etre " of the Baltic Exchange is that the tramp ships of the world and their charterers, irrespective of nationality, find it advantageous to have one Exchange or Market where enquiry from both sides is centralised. This is achieved by every tramp Shipowner in the world having his representative on the Baltic Exchange, and every potential Charterer of a tramp ship having his representative there also. In this way the suitable ship and the suitable cargo are brought together expeditiously and easily, the contacts between the respective brokers being immediate and continuous. Such has been the success of the arrangement since its inception in the coffee houses of the City of London 200 years ago, that the voyages arranged on the Exchange are in no sense limited to cargoes to and from the United Kingdom, but cover the requirements of Shippers from one foreign port to another anywhere in the world. To-day it is the fact that practically every cargo in the world available to a tramp ship is quoted on the Baltic Exchange, and every tramp ship of the world available for cargo is similarly represented by its Broker.

The development of air freight is proceeding on similar lines. Aircraft are divided into scheduled air liners and chartered 'planes, or, if you prefer, air liners and air tramps. Each requires its own kind of commercial machinery and each will contribute in its own way to the development of trade. It is a mistake to regard the air tramp as a competitor of the air liner, or vice versa. As with ships, the one is ancillary to the other in the matter of trade development. Both are types of communications, the one fitted to one form of traffic and the other to another. The air liners have their own commercial machinery similar in form to that used by the Shipping Lines. The air tramps require machinery identical with that which tramp ships enjoy in the medium of the Baltic Exchange.

But even though liners and tramps of both the sea and air have their own particular commercial machinery, there is a link between the two provided by the Baltic Exchange. Shipping Lines often find themselves short of ships and they charter extra vessels on a time basis through the Baltic Exchange. Again, there are often Shippers who require a vessel to lift cargo and would prefer to charter one, but find they cannot because the size of the cargo proves too small. In this case, the cargo is dealt with as a parcel and is booked on a Shipping Line. It is easy to envisage parallel situations to these arising with air freight, and it emphasises the element of co-operation—as opposed to competition—which the Baltic Exchange provides as between liner and tramp.

The efficiency of an Exchange is measured by the extent of its representation, so that the objective of the Air Freight Section of the Baltic Exchange is that every commercial aircraft operator in the world and every potential user of such aircraft shall be represented. Such representations can be achieved either by being a member firm of the Baltic Exchange or by appointing existing members firms as Brokers or Agents. Already many aircraft

Baltic Mercantile and Shipping Exchange—continued

operating companies have joined the Exchange or appointed their representatives, and many Shippers have appointed Brokers or Agents to quote their requirements on the market.

A list of member firms already actively engaged in air freight business is available on application to the Secretary of the Air Freight Advisory Committee, Baltic Exchange, St. Mary Axe, London, E.C.3, and all those interested are recommended to put themselves in touch. In this way, not only can it be arranged that the particular requirements of the Operator or Shipper be made known on the market, but conversely the representative appointed will take upon himself the task of keeping his principal informed of day to day trends in the market, and the developments in air transport in general.

Notable Port Personalities

LVII—Lt.-Col. P. A. J. Hernu

Paul Alfred John Hernu was educated at St. Mary's Preparatory School (St. Leonards-on-Sea) and at St. Edmund's College, Ware, and entered the family concern of Messrs. Hernu, Peron

Lt.-Col. P. A. J. Hernu.

& Co., Ltd. (Shipping Agents), in 1920. After three years in London, he went to France to learn the Continental side of the business, and for four years studied Continental road and rail transport, as well as all the aspects of French and international traffic to the United Kingdom and vice versa. He was then stationed in Boulogne and directed his attention to dock operating, both in respect of freight and passenger traffic. It was at this time that he had experience in Port Administration and Development in most of its aspects in connection with the Port Authorities' Committee for the further development of the harbour, which was then being initiated.

After spending a period of seven years at Boulogne, Mr. Hernu returned to London in 1935, where he had further shipping experience until the outbreak of the recent war. As a Territorial Officer, he immediately joined his Unit, 7th Battalion, Royal Berkshire Regiment, being promoted to the rank of Major in 1941. He was transferred to the Royal Engineers (Transportation) in 1942 and was posted to the No. 7 Port Operating Group, R.E., with whom he saw service in North Africa, being stationed at Algiers. Here, with on occasion, 1,000,000 tons of shipping waiting to discharge cargo, port operating had to be geared to deal with the large tonnage passing through the port. Later he became Port Superintendent at Bone and was responsible for the operating of that port during the mounting of the early part of the Italian offensive, as well as the maintenance of the harbour plant and equipment.

He then saw service in Italy and, after promotion to Lt.-Col., he was given command of 6 I.W.T. Group, R.E., and as this was the only I.W.T. Group in the theatre, he was responsible for the I.W.T. services in Ancona as well as the base ports of Bari, Brindisi and Taranto, and later in the Po delta, Venice and Genoa.

After the end of hostilities, Lt.-Col. Hernu was appointed Deputy Chairman of the Colombo Port Commission in September, 1945, and became Chairman a few months later.

On assuming his duties at Colombo in 1945, he found that no effective plans had been drawn up for the much needed post-war development of the port. He therefore proceeded immediately with the drafting of plans covering all aspects of the port—construction, administration and operating. The proposals for the construction of the Oil Dock and Deepwater Quays have been approved by Messrs. Coode, Vaughan-Lee, Frank & Gwyther, the Consulting Engineers in London, and Mr. Gwyther recently visited Colombo to discuss matters of detail on the spot prior to drawing up contract plans. The proposals for the changed administration and operating of the harbour services are far advanced, and it is expected they will shortly be implemented.

Harbour Radar for Liverpool

The first specially designed harbour radar installation in the world, which is being constructed by the Sperry Gyroscope Company, Ltd., at Brentford, is shortly to be transported to Liverpool, where it is expected to be in full operation towards the end of July. Before being despatched, the equipment was erected in the company's factory for test purposes. A very successful demonstration of the installation was held on 21st May last, at which mmebers of the Safety of Life at Sea Conference were present.

When the equipment arrives at Liverpool, the radar scanner will be mounted on an 80-ft. tower at the north-west corner of Gladstone Dock, from which it will command an unrestricted view of the River Mersey as far as the Prince's Landing Stage and of the whole of Liverpool Bay. The scanner, with its drive mechanism, weighs two tons, and it is interesting to note that the pedestal casting is the largest light alloy casting ever heat-treated in the United Kingdom. Built-in heaters will prevent icing, and the scanner will continue to rotate in winds up to 100 m.p.h. The scanner has a span of 15-ft., and rotates at 12 rev. per min. and during this five-second rotation obtains an echo of every object within 20 miles.

Alongside the tower will be housed the remainder of the radar apparatus, the generators and communication equipment. The radar room will contain the display console, synchronised units and power packs. The display console will have six displays. The first will show a small-scale view of the whole of the Liverpool Bay with a normal maximum range of 13 miles, which can be increased to 20 miles if necessary. Four of the other displays will provide larger-scale pictures of each quarter of the 14-mile length of the approach channel. These displays, which are of a new type, give a precision picture and a true plan presentation. They will slightly overlap each other and will have in front of them a chart showing all buoys and other navigation marks. By means of a rectangular grid on each display the position of any vessel can be fixed. The sixth display, known as a " wandering display," enables on a large scale any area that is within 20 miles but that is not shown in the four pictures forming the mosaic of the estuary to be examined at will.

In the development of the special display equipment, the Sperry Gyroscope Company have had the collaboration of Cossar Radar, Ltd., as sub-contractors.

The Impact of a Vessel with a Pier

By H. T. HORSFIELD, M.Sc. (Eng.), A.M.I.C.E.

In connection with reconstruction work at the New Holland Pier, the Civil Engineer's Department of the Eastern Region of the British Railways has carried out an investigation of the effectiveness of some rubber buffer pads under practical conditions. From the results of the tests, some information can be gained about the magnitude of the blow delivered to a structure by a vessel colliding with it.

The railways provide a ferry service across the Humber between New Holland Pier and Hull. The river is about 1½ miles wide at this point; the tidal range at springs is 24-ft. and the velocity of the ebb may reach 5 knots. Three paddle steamers maintain the service, the largest, the *Lincoln Castle*, having a displacement when fully loaded of 596 tons. The face of the pierhead is parallel to the shore and the normal method of berthing is to steam slowly alongside against the current, a few feet away from it, and to secure a mooring forward. The vessel then drops back and swings slowly against the pier face. The berthing takes an

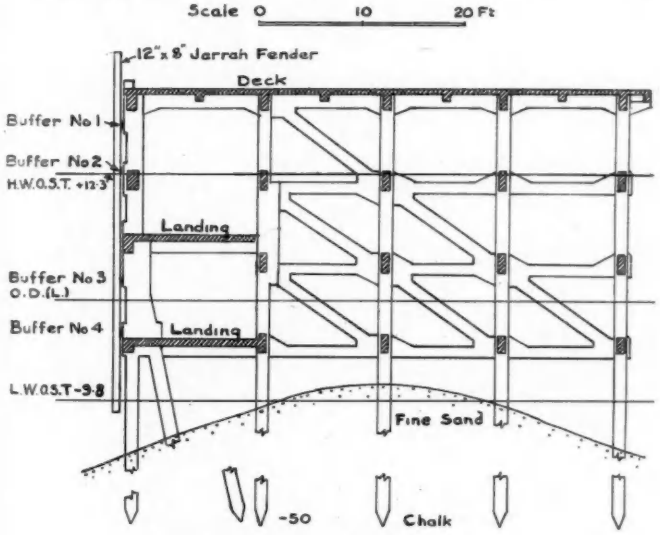


Fig. 1.—Test Fender and Pier.

appreciable portion of the twenty minutes allowed for the three-mile crossing, and it must be carried out smartly if delays to the connecting trains are to be prevented. The berths, moreover, are very exposed and a north wind, blowing the shallow draught vessels towards the pier, makes bumps difficult to avoid. As the service is maintained under all weather conditions and involves berthing a dozen times a day, the design of the fendering is a very important matter.

The trial was made on a portion of the pier where the fendering consisted of vertical lengths of 12-in. x 8-in. jarrah at 12-in. centres, bolted back to projections from the reinforced concrete structure of the pier (Fig. 1). The face of the fender is protected by a wrought iron rubbing strip. At four points a rubber buffer, 4-in. thick, was inserted between one of these fender timbers and the concrete. Each buffer consisted of four rubber pads, 12-in. x 8-in. x 1-in., interleaved between five iron plates, 12-in. x 8-in. x 16 gauge. Two bolts, 1-in. diameter, passed through holes in each buffer securing the fender to the concrete. The holes in the rubber were made larger than the bolt diameter to allow the rubber to expand laterally when compressed. The testing of these buffers was carried out under conditions closely resembling normal berthing (Fig. 2). As the fender, on which the buffers had been fixed, stood 4 inches in front of the general line of fendering, there was no difficulty in arranging that it took the first impact. Three series of tests were made on different occasions and the pads showed themselves able to carry satisfactorily all the impact loads applied.

During these tests, however, figures were obtained for the maximum compression of the pads and the velocity of impact, which enable some deductions to be made in respect of the impact forces involved. The method of measuring the maximum compression is illustrated in Fig. 3. A piece of stiff cardboard is attached to the side of the fender, and a straight edge is held against the concrete of the pier, so that it lies immediately in front of the cardboard. Any compression of the buffer causes a displacement of the cardboard relative to the straight edge. Consequently the

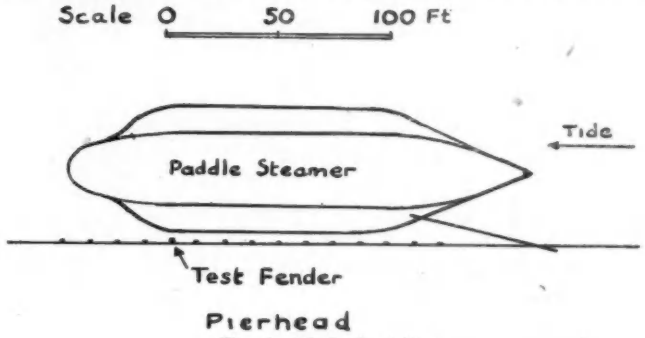


Fig. 2.—Method of Test.

deflection of a pencil line, ruled while the impact is occurring, shows the maximum compression of the buffer. Velocity was determined by a distance rod and a stop watch, and was generally measured over the last 6 feet before impact. The observations for three impacts are shown in Fig. 4.

When the tests had been completed, the buffers were removed and one set of four rubber pads with the iron plates was subjected to compression in a testing machine. The load-compression relationship was determined and is shown in Fig. 5. Loading was gradual, whereas behind the fender it had been sudden. Another difference was that the two fender bolts normally passing through the buffer had to be omitted in the testing machine. The failure of the buffer under a load of some 150 tons was interesting. Under load the rubber pads expanded laterally, but were restrained at the surfaces in contact with the iron plates. As the load was increased above 150 tons, the iron plates suddenly fractured in rapid succession under the tensile stresses to which they were subjected.

With this load-compression relationship established, it is possible to determine some figures for the actual instantaneous loads carried by the fender buffers. For the three impacts shown in Fig. 4, the maximum loads on the buffers are derived from the measured com-

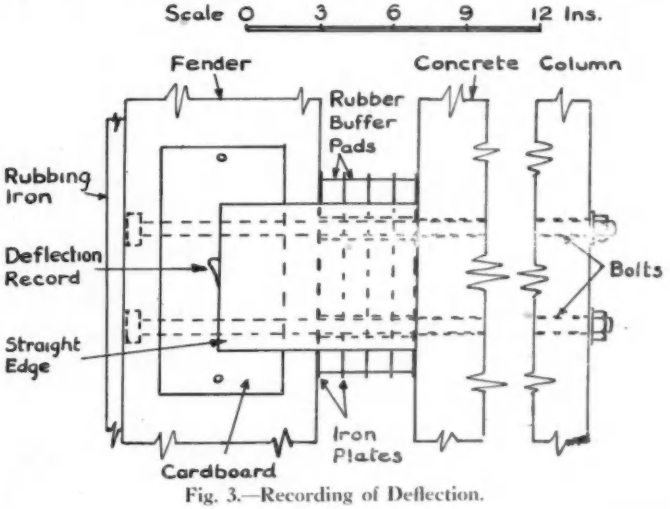


Fig. 3.—Recording of Deflection.

pressions by means of Fig. 5, and are set out in column 5 of Table 1. The addition of the maximum loads on the separate buffers, which occur practically simultaneously, gives a figure in column 6 for the maximum instantaneous load coming on the reinforced concrete structure. These three totals are in reasonable agreement.

Impact of a Vessel with a Pier—continued

TABLE 1.

1 Test	2 Impact velocity ft./sec	3 Buffer No.	4 Maximum Compression ins.	5 Maximum Load tons	6 Total Maximum Load tons
A ...	0.8	1	0.03	1	
		2	0.02	1	
		3	0.88	82	
		4	0.68	47	131
B ...	1.0	1	0.05	2	
		2	0.03	1	
		3	0.96	98	
		4	0.60	40	141
C ...	1.0	1	0.02	1	
		2	0.10	5	
		3	0.90	87	
		4	0.51	31	124

The line of action of the resultant of the loads on the buffers has been worked out and is shown on Fig. 4 at about 1-ft. above the measured level of the impact blow. This discrepancy may be due to (1) inaccurate measurements; (2) the maximum loads on the buffers not occurring simultaneously; or (3) some of the impact load being taken by the through bolts of the fender. At the lowest buffer, No. 4, two fender bolts pass through 3-ft. 7-in. of concrete and if these did not slide freely some of the load would be transmitted to the main structure by friction.

The energy imparted to the pier by the blow is absorbed by deformation of:

(1) The fender;
(2) The buffers;
(3) The reinforced concrete structure.

The jarrah fender may be regarded as a continuous elastic beam having a point load and being carried on four yielding supports.

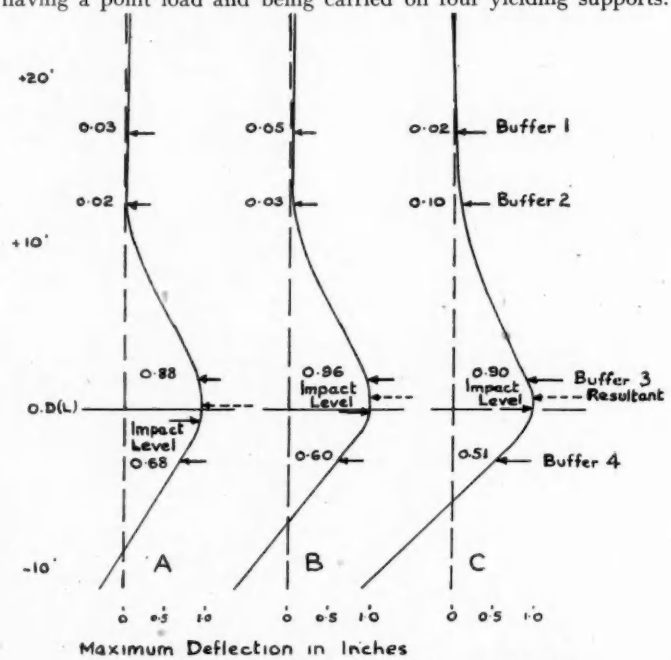


Fig. 4.—Maximum Deflections of Fender and Buffers.

The maximum reactions of the supports have been calculated and a value of the maximum point load has been obtained. From Fig. 4, showing the maximum deflections of the fender, a figure for the strain energy absorbed has been derived graphically using the formula:

$$\text{strain energy} = \frac{EI}{2}\int\left(\frac{dy^2}{dx^2}\right)^2 dx$$

The figures obtained are given in column 3 of Table 2, the modulus of elasticity, E, for jarrah being taken as 2,200,000 lbs./sq. in. As the fender deflection was measured at only four points, the shape of the bent fender was not determined exactly, and the figures for the strain energy are very approximate. However, the strain energy absorbed by the fender is small compared with that absorbed by the buffers and ascertained with greater accuracy. The energy absorbed by each buffer was derived from the area under the

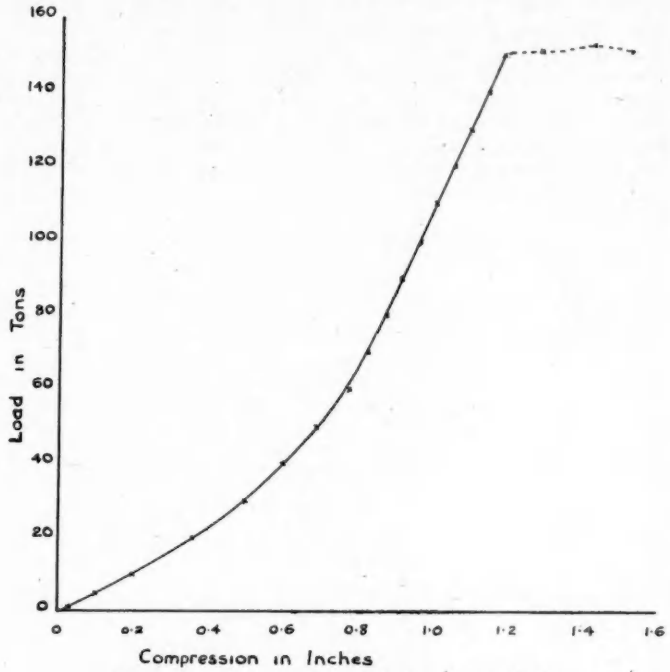


Fig. 5.—Load-Compression Relation for a Buffer.

curve in Fig. 5 corresponding to the recorded compression, the figures being given in column 5 of Table 2.

TABLE 2.

1 Test	2 Impact velocity ft./sec.	3 Energy absorbed by fender ft.-tons	4 Buffer no.	5 Energy absorbed by buffer ft.-tons	6 Total energy absorbed by buffers ft.-tons	7 Total energy absorbed by fender & buffers ft.-tons	8 Nominal kinetic energy of vessel ft.-tons	9 Nominal kinetic energy absorbed o/o
A ...	0.8	0.2	1	—				
			2	—				
			3	2.2				
			4	1.2	3.4	3.6	5.0	72
B ...	1.0	0.3	1	—				
			2	—				
			3	2.8				
			4	0.9	3.7	4.0	7.8	51
C ...	1.0	0.2	1	—				
			2	—				
			3	2.4				
			4	0.6	3.0	3.2	7.8	41

Though the loads transmitted to the concrete structure are known, the deflections are not. No motion was perceptible during the tests. The structure is heavily braced and is very rigid in comparison with the fendering system, so the energy absorbed by it would be relatively small. Neglecting this small indeterminate quantity, the total energy absorbed by the pier is taken as the sum of the amounts absorbed by the fender and buffers and is given in column 7 of Table 2.

In column 8 is given a figure termed by the writer the nominal kinetic energy of the vessel. This is taken as $\frac{W v^2}{2g}$ ft.-tons, where W = the actual displacement of the vessel in tons = 500, and v = the velocity of impact in ft./sec.

Impact of a Vessel with a Pier—continued

The percentage of this nominal kinetic energy absorbed by the pier is given in column 9. The figures are somewhat surprising, as it appears that from 41 to 72% of the vessel's kinetic energy has been absorbed. R. R. Minikin has derived figures of from 18 to 27% from model experiments with vessels colliding head on with a jetty.*

A point to be considered is that an error in the determination of velocity or deflection is magnified when the corresponding energy is calculated. But if 10% is taken as the observational error in velocity, the inaccuracy in the vessel's kinetic energy is 21%, and if 5% is the error in a deflection measurement, the error in the energy absorbed by the buffer is about 14%. Making allowance for these possible errors, the percentage of the vessel's nominal kinetic energy absorbed by the pier seems very high.

It must be remembered that the centre of gravity of the vessel lies below the water line, and its line of motion immediately before impact cannot pass directly through the point of impact on the fender. The impact force, therefore, will convert some of the linear motion of the vessel into a rotational motion about the horizontal longitudinal axis through the centre of gravity. The vessel

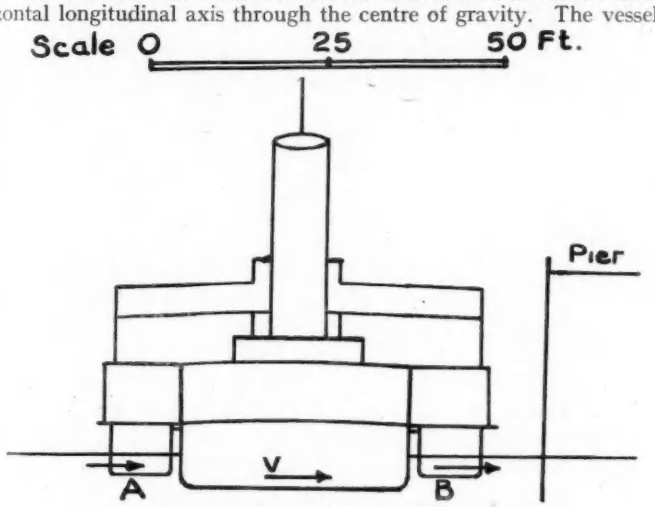


Fig. 6.—Motion of Vessel and Water.

will convert kinetic energy to potential energy, then, in a fashion similar to a pendulum fender. Generally there will be also some conversion of linear kinetic energy into rotational kinetic energy about the vertical axis of the vessel. Consequently, some of the vessel's kinetic energy will remain unabsorbed by the first impact. Furthermore, of the energy absorbed in the collision, a certain amount is undoubtedly taken by the vessel itself through deformation of the horizontal fender fitted along the paddle box wing.

The writer would suggest the following explanation of the apparently very high percentages of kinetic energy absorbed by the fendering. When a vessel under its own power approaches a quay in still water, its motion is along its longitudinal axis. As the vessel normally moves in this direction, its lines are designed to give minimum resistance and the volume of water set in motion is comparatively small. When, however, as in these tests, a vessel is moving broadside on, in a direction perpendicular to its longitudinal axis, there will be considerable resistance to its motion through the water. This will tend to reduce the approach velocity of the vessel, while giving to the water a general velocity in the direction of the approach. As will be seen from Fig. 6, there are substantial masses of water at A and B moving in the same direction as the vessel, and having velocities ranging from zero to v. The pier is an open structure and offers no serious impediment to the motion of this water, and there is no cushioning effect as the vessel approaches. When the motion of the vessel is stopped by the fendering, the motion of these masses is impeded also, and there will be a corresponding increase in the impact blow. Evidently considerable investigation will be necessary before an accurate estimate can be made of the kinetic energy of the water moving with a ship, and how much of this is transmitted to the pier at the first impact.

For the present, the writer would stress that for transverse motion of the vessel the value of $\frac{Wv^2}{2g}$ must be regarded as a purely nominal figure for the initial kinetic energy of the system, and that in estimating the proportion of this nominal energy absorbed by the fendering high coefficients must be expected. It is regretted that fuller information cannot be given on this important subject, but, as has been stated earlier, the primary object of the tests was to determine the suitability of the rubber buffer pads—the figures for the fender loading were obtained incidentally. The writer would have liked to investigate with accurate recording instruments the energy absorption coefficients over a considerable range of velocities, but unfortunately such a project lay outside the investigation authorised.

The writer is indebted to J. I. Campbell, M.I.C.E., Civil Engineer to the Railway Executive, Eastern Region, for permission to publish the information contained in this article.

* "The Design of Jetties," Dock & Harbour Authority, October, 1943.

Correspondence

To the Editor of *The Dock and Harbour Authority*.

Dear Sir, **Impact of a Vessel with a Pier.**

The article by Mr. H. T. Horsfield on the tests which were carried out at the New Holland Pier is most interesting and informative. He expresses surprise that the results show higher values for the energy absorption factor than he expected. He further quotes the values I arrived at in model experiments. Now I was careful to point out, when my figures were published, that they referred to wood to wood impact in quiet water and free. The New Holland Pier tests were under entirely different conditions. In the first place, the motive power of the vessel was the current, that is, a mass of water impelling the vessel forward. The direction of the vessel's movement is the direction of the current until such times as the mooring rope becomes taut. The vessel is then swung inwards like a pendulum towards the jetty, but the motive power—in other words, the current—is not shut off, it is still operative, and hence a greater blow is delivered. It is as though the mass of the vessel were increased by the amount of a mass of water moving along with it, as Mr. Horsfield tentatively suggests.

In the second place, the jetty structure is extremely rigid. The fendering system, even with the rubber plates, is also stiff, as can be gathered from the small deflections registered.

The datae of test "A" seems to point to some factor influencing the readings which is not present in tests "B" and "C." One regrets that a few more tests were not carried out to verify the position of the mean. It is possible, in the test "A," that the rubber buffer was not depressed uniformly and the side on which the straight edge lay showed a greater reading than the opposite side. In the "Dock and Harbour Authority," June, 1947, I then suggested that the value of the energy absorption factor for steel vessels and reinforced concrete jetties may be of the order of 0.5. Tests "B" and "C" seem to bear this out.

Consideration of the buffer reactions in the present tests as given in column 5, Table 1, and the position of the point of impact do occasion some surprise. The cross section of the jarrah fender is 12-in. wide and 8-in. deep. This means that if the loads were simultaneous, then the fibre stress in the fender was over 14 tons per square inch, whereas the usual value of the ultimate stress, in tension, of commercial jarrah, is only 6 tons per square inch. It would be of advantage if Mr. Horsfield could clarify this point. Should the opportunity arise to carry out further tests, I would suggest a most positive method of noting the deflection. I have found, when instruments are not available, that some plastic material, clay or plasticene, in the form of a cylinder or a brick, is useful. In the present example, one could be placed above and another below each buffer, on the centre line of the fender.

Yours faithfully,

R. R. Minikin.

13, Mendip Gardens,
Bath, Somerset.

5th May, 1948.

PORT OPERATION

Part 17 of a Series of Articles by A. H. J. Bown, M.Inst.T., A.C.I.S., and Lt.-Col. C. A. Dove, M.B.E., M.Inst.T.

(Continued from page 18)

It will be recalled that in the original plan for this series of articles, it was proposed to devote the present section to a brief treatment of each of the following matters:—

(1) Free ports.
(2) Bonded warehouses.
(3) Radar in port operation.
(4) Turn-round.
(5) Safety measures.
(6) Hygiene.
(7) Statistics and graphs as tools of management in ports.

The subject of bonded warehouses has already been dealt with on page 259 (February, 1948): the important question of the turn-round of ships in port was fully discussed on pages 209, 210 (December, 1947): and safety measures and hygiene formed the subject of last month's article (May, 1948). The following notes relate to the remaining topics listed above, namely, free ports; radar in port operation; and statistics and graphs as tools of management.

Free Ports

A Free Port or Free Zone has been defined in recent years as follows: "An isolated, enclosed and policed area, in or adjacent "to a port of entry. It has no resident population, is furnished "with the necessary facilities for lading and unlading, for supply-"ing fuel and ship's stores, for storing goods and re-shipping them "by land and water. It is an area within which goods may be "landed, stored, mixed, blended, re-packed, manufactured and "re-shipped without the intervention of Customs officials. It is "subject equally with adjacent areas to all the laws relating to "the public health, vessel inspection, postal service, labour con-"ditions, immigration and, indeed, everything except Customs." This definition is not universally applicable in all its details but it states the general principles.

There are no Free Ports in Great Britain. The system has been tried, at one time and another, in the following ports, amongst others, and it is still in vogue at some of them:—Leghorn, Hamburg, Bremen, Lubeck, Danzig, Copenhagen, Stockholm, Gothenburg, Malmo, Trieste, Sulina (Danube), Hong Kong, Singapore, Penang, Macao, New York, Mobile and New Orleans.

Goods coming into a Free Zone pay no import duty. Therefore (it is contended) a merchant who manipulates and then re-exports such goods can sell more cheaply in the foreign market than a merchant who has had to import them and pay duty.

Against this, it is urged on behalf of the British system that bonded stores exist into which imported goods may be placed duty-free and from which they may be re-exported duty-free; that direct transhipment from incoming ship to outgoing ship is duty free; and that where import duty has been paid, the drawback system restores practically all the duty upon proper proof to any merchant re-exporting the goods intact. There are other supplementary privileges designed to assist traders in every reasonable way.

The advantages claimed for the Free Port system may be briefly summarised as follows.—

(1) Swifter clearing of quays and thereafter swifter turn-round of ships.
(2) No delays through waiting for Customs attendance, official tallies and examinations.
(3) No need for bonding or drawback.
(4) Full control by merchant over his own goods so that he can display them, give samples and manipulate the goods freely.
(5) Money that might be tied up in duty can be employed in more trade.
(6) Smuggling becomes less of a temptation and therefore declines.
(7) Saving on land transport.

The difficulties of the system may be stated thus:—

(1) Suitably isolated areas, capable of being strongly guarded and freely accessible to shipping, are not easy to find.
(2) Free ports confer a strictly localised benefit and therefore tend to create monopolies.
(3) Goods may be dumped and held duty-free and released when the market is favourable against the interest of home manufacturers.
(4) The full Customs system is still necessary to deal with goods which pass out of the area to inland consumers.

In addition to the free ports mentioned above, free ports or free zones were established in Mexico, in 1944-5, at Puerto Mexico, Salina Cruz, Topolobampo and Matias Romero.

Also in 1944, there was a strong demand from a section of international traders in New York "that additional free port or free "zone facilities be created at such points where the goods of the "world are distributed, and that these ports and zones be pro-"vided with adequate storage and handling facilities."

In 1946, it was suggested in some quarters that the chief ports of South Wales should be established as Free Ports as a special measure to assist them to recover the prosperity which they had lost as a result of the decline in the coal export trade. The suggestion was not taken up.

It is noteworthy that the Celler Foreign Trade Zones Act, passed in the U.S.A. in 1934, appeared likely at one time to produce a crop of Free Ports but, for some years, only Staten Island, New York, materialised. In this Free Zone, from 1937 onwards, imported goods could be manipulated (i.e., re-packed) but not submitted to any process of manufacture. Latterly, serious consideration has been given to the proposal to extend the Free Zone privileges to permit manufacturing within the boundary.

A foreign trade zone was set up at New Orleans in 1946. The ports of Los Angeles and San Francisco have filed applications for similar privileges.

In Canada, the ports of Quebec, Halifax, St. John, Montreal, Vancouver and Victoria evinced interest in the idea in 1946; but after full consideration, the Canadian Government has announced "that it is at present inadvisable to pass enabling legislation for "the creation of foreign trade zones in Canada." The Canadian Government formed this opinion in the light of unsettled world conditions, the imminent possibility of tariff changes, the unlikelihood of increased trade resulting, and the smoothness and efficiency of the existing bonding and Customs system.

Further thought is given to the matter from time to time in British Government circles, but Chambers of Commerce who have investigated the possibilities do not feel that any real advantage would be gained by the creation of Free Zones in this country.

The foregoing notes are based substantially upon the excellent and informative article by Mr. G. R. Stocks, entitled "Free Trade Zones and Re-export Reliefs" which was published in this Journal in October, 1945 (page 137); and upon Editorial reference to the matter which have appeared in this Journal from time to time. Grateful acknowledgment is made accordingly and students are referred to these sources for further study of the subject.

Radar in Port Operation

Radar is a British invention first brought into use during the war of 1939-1945. In its first form it consisted of a shore station sending out wireless impulses which, upon encountering any metal object, sent echoes back to the transmitter. This device was de-

Port Operation—continued

veloped and employed to detect the imminent approach of hostile aircraft or ships.

The next stage was the transformation of the echoes into patches of light shown as a continuous image on a dark screen in the transmitter.

The extension of the device for use by ships at sea, or when approaching or leaving harbour, quickly followed, and is now being widely adopted. It is proving of great value to vessels navigating in fog, darkness, snow or heavy rain. It has recently been stated by a technical expert that, in general terms, the radar installation on board the " Queen Elizabeth " will reveal a coastline 25 miles away; a medium-sized ship 17 miles away; an iceberg about 10 miles away; and a second-class navigational buoy about 2½ miles away. In exceptional circumstances, radar echoes from vastly greater distances have been picked up by shore stations.

It has been repeatedly stated, and is of great importance to remember, that radar is in no sense a substitute for navigational skill, nor does its use, on ship or shore, relieve masters of vessels of any part of their responsibility for the safety of their ships. Radar is an ingenious aid to navigation—but, for the time being at least, it is no more than that.

In great estuaries, even those having long, tortuous, dredged channels, a vessel using radar might be able to leave or enter, in thick weather; but, owing to the limited field of her own installation and to the blurred image resulting from many other vessels, cranes and harbour equipment generally, she would not be able to attempt such an manœuvre safely unless assistance was obtainable from a shore-based radar installation of greater power and greater field of vision than her own. Hence the interest now being taken in the possibilities of radar in port operation.

It will be evident that even radar on the ship and radar on the shore would not be enough. The two operators must be able to talk to each other and this is accomplished by the use of the radio-telephone in association with radar.

The first possible advantage of shore-based radar at ports is, therefore, the saving of ships' time in thick weather. Vessels that would otherwise anchor (and possibly miss the tide) might be guided into or out of the port without any delay at all. Vessels with radar of their own would probably be more disposed to move than others, but even unfitted vessels might be willing, in some conditions of weather, to enter or depart if they could have full information as to the state of the channel and the traffic ahead of them.

It has also been suggested that harbour-based radar would immediately detect a vessel in difficulties—possibly fouling the channel—and prompt assistance could thus be given and a general warning issued. Again, radar help might be given to pilot boats seeking vessels in foggy weather; a port authority would be able to keep constant check on the accurate position of buoys; vessels could be assisted in the calibration of their directional wireless in fog; and accurate information regarding incoming vessels could be collected and disseminated to H.M. Customs, Immigration Officials and the Port Health Authority, and other interested organisations.

Radar installations, for giving guidance to vessels from the shore, are in use at two ports and are under consideration at some others. The present position is understood to be as follows:—

(1) **Wallasey.** The Ferries Department of the Wallasey Corporation instituted radar control of their cross-river ferry service on the Mersey Estuary in September, 1947. The installation is housed at Seacombe Ferry, where a Standard Cossor Marine Radar set has been fitted until a special set can be made. The scanner is placed on a clock tower 90-ft. above ground level and 317-ft. back from the ferry landing. Communication between the radar station and the ferry steamers is by radio-telephone. The principle purpose of this development is to keep the ferry service up to a good speed in foggy weather.

(2) **Douglas, Isle of Man.** Radar and the radio-telephone were brought into use at Douglas in March of this year. The harbour authorities are thereby able to obtain a complete picture of ships navigating the harbour area and they are in a position to offer information to ships so that they are better able to proceed in conditions of bad visibility. A 60-ft. high scanning tower has been erected on the main pier about 300-ft. from the harbour mouth, and this is connected by 220-ft. of cable to the radar control room, which is situated at the end of the pier. The set gives a radar plan of the harbour and surrounding seascapes at ranges of .8, 1.2 and 3 miles.

(3) **Liverpool.** The Mersey Docks and Harbour Board are now in process of fitting radar and radio-telephony at the Gladstone Dock, Liverpool, with the object of keeping under survey the 19 miles of channel down to the Bar Light Vessel, and of being in a position to offer information to vessels desiring it. The Sperry Gyroscope Company, Limited, are associated with the work at Liverpool.

(4) **Canada.** In Canada, the Department of Transport and the National Research Council are co-operating to determine what use can be made of radar at the entrances to ocean ports. Experimental equipment is in use at Halifax Harbour. It has a range of 25 miles.

In preparing the foregoing notes, the Authors have derived substantial assistance, which is hereby gratefully acknowledged, from the excellent explanatory booklet, entitled " Harbour Supervision Radar for Liverpool," compiled and privately issued by the Mersey Docks and Harbour Board and the Sperry Gyroscope Company, Limited. They have also obtained valuable information from the Press reports of articles, addresses and speeches by Lieutenant P. G. Satow, D.S.C., R.N., of H.M. Navigation School Southwick, Hants; Mr. A. K. Nuttall of the Metropolitan Vickers Electrical Company, Limited; Commander L. D. Price, General Manager of the Wallasey Ferries; and Sir Robert Watson-Watt, the eminent radar scientist. The attention of students is particularly directed to the articles on " Radar " which have appeared in this Journal in recent months.

Statistics and Graphs as Tools of Management in Ports

The present writers' experience of the subject of statistics and graphs is that it is not merely fascinating but can easily become fatally fascinating. We do not go so far as to offer to the port operator, about to develop or build up his statistical system, the advice once offered by Mr. Punch to those about to marry; but we do recommend that he should begin by forming clear ideas as to what he really wants to know; and that, thereafter, he should ask himself, from time to time, whether he still wants to know it and whether the knowledge is doing him, or his Undertaking, any good; or failing that, whether it is likely to be useful to anybody at all in time to come. The multiplication of statistical returns is no substitute for a busy dock; and one extra cargo of red iron ore is better than a thousand green curves on the Traffic Office wall.

Nevertheless, figures there must be—daily, weekly, monthly, quarterly and yearly; and comparisons there must be; and if graphs promote the swift assimilation of the figures, let there be graphs also.

What does the practical port operator want to know on any given morning? The questions requiring answers are something like this:—

(1) What ships are loading or discharging, and at which holds? What is the cargo in each case? How much has been loaded or discharged up to close of work yesterday? How long has each ship been working? How is the daily rate comparing with the estimated rate? How much was done yesterday? When is the vessel expected to finish?

(2) How many and what cranes are working? How many are idle? What heavy lifts have been made and how many remain to be made?

(3) What berths are occupied? What berths are unoccupied?

(4) How many dock locomotives are working? How many are idle—and why?

(5) What vessels have arrived on the last two tides? What vessels have sailed?

(6) What vessels are expected to arrive (for as long ahead as possible) and what is the latest news of each of them?

Port Operation—continued

(7) What vessels, other than cargo-working vessels, are occupying berths and what are they doing?
(8) How many empty wagons have been supplied by the Railway Organisation? How does the supply compare with yesterday's requisition—as to number, and as to type? How many empty wagons are on the premises of the Railway Organisation, waiting to come in? How many loaded wagons are on the dock premises waiting to go out? If there are any road transport orders on hand, how is the work proceeding? If there is any overside work to do, how is it proceeding?
(9) How many dock workers have been taken on, both on ship and on shore, and for what jobs? How many have attended but failed to obtain work?
(10) Are the permanent weekly staff all present and at work?
(11) What is the stock position at the various warehouses? What went in and out yesterday and what operations are contemplated for to-day? What is the stock position at open storage areas?
(12) What is the position as to user of the Undertaking's own internal railway wagons? How many are under load and where are they? How many are empty and available and where are they? How many are under repair?
(13) Was the ship-work stopped at any berth yesterday? If so, why, and for how long?
(14) Were there any accidents to personnel yesterday? If so, what are the particulars?
(15) Were there any breakdowns or accidents to equipment or plant yesterday? If so, what are the particulars?
(16) What vessels are expected to finish to-day? What vessels are expected to sail to-day or to-night? Are any vessels going to move from one berth to another to-day? What vessels are expected to arrive to-day or to-night?
(17) What are the tide times, the prevailing weather and the weather forecast?

Before he commences his day's work, the Traffic Manager will already possess the answers to some of the foregoing questions; the answers to others will be ready for him, on arrival, in the shape of daily returns already made up for him by his assistants, foremen, timekeepers and checkers; and he will rapidly obtain and record the remainder from consultations with the Harbour Master, the Dock Masters and the Railway Organisation.

The records thus made are part of the raw material from which the more far-reaching statistical system of the Undertaking is built up at the Head Office of the Undertaking—largely under the direction of the Chief Accountant and primarily for the information of the General Manager. Copies of every important return have been taken and despatched to the Head Office simultaneously with the preparation of the originals at the docks. The same process is regularly followed with wages sheets, time sheets and checkers' returns.

What is required of the over-all statistical system of the Undertaking, so far as operation is concerned? This is a question of primary interest to the Traffic Manager and the General Manager —and it is one which they frequently discuss together.

Writing in this Journal in May, 1947, Mr. J. A. Philpott, A.L.A.A., A.C.I.S., A.M.Inst.T., Chief Accountant to the Port of Bristol Authority, pointed out the value of preparing a complete Profit or Loss Account on the working of each ship; and he made a series of suggestions as to how the necessary information should be collated and the account presented. Every Traffic Manager and every General Manager will agree with Mr. Philpott as to the great usefulness of this practice. It is a principal part of the statistical information likely to be valuable to the Traffic Manager.

To compare a number of similar ships, parcels and/or operations over a period, Mr. Philpott recommended a useful graph. We commend the whole of Mr. Philpott's two articles (May and June, 1947) to the careful consideration of students and we quote, in particular, his suggestions regarding graphs:—

" A very useful form of presentation is to plot on one graph " four curves representing respectively the cost of handling each " ton of goods discharged ex-ship to truck, lorry, craft and store. " The vertical scale would show the cost in pence and the horizontal " markings would indicate the vessel by name and show also the " quantity discharged and the berth concerned. A separate " graph would be plotted for each type of cargo. A study of the " graph would disclose, for example, any consistency in the results " obtained at a particular berth which might be above or below " the average, or it might reflect the relative efficiency of super- " vision at the various points. Any case wide of the average " would call for immediate comment and should lead to a close " examination of the ship's account.

" Another feature to be observed would be the suitability of a " berth for particular operations, e.g., a below average cost would " be expected for ex-ship to truck operations at a berth where the " lay-out of sidings facilitates the movement in of empty trucks " and the rapid withdrawal of those loaded; in the contrary case " a bottle-neck in sidings leading to and from a berth would in- " evitably be reflected in slower working and higher costs. The " type of crane, width of quay, number of tracks, provision of " capstans, these and many other features affect the working " results at each berth and the graphical presentation of costs " brings out these variations more clearly than tabular statements " of figures. To these permanent features would be added the " variations arising from circumstances relating to the ship itself, " such as bad stowage, mixed marks, stress of weather and the " breakdown of ship's gear.

" In the graph described it would be useful also to draw across " the page a dotted line to represent for each of the curves the " average for the preceding year, or alternatively, the revenue " curve. As previously mentioned, so many circumstances can " combine to make a profit or a loss, even where similar cargoes " are being worked, that it is always interesting to discover the " cause of the one or the other and whether traceable to the ship, " the berth, labour, gear or just good or bad management.

" Where homogeneous cargoes are concerned a graph showing " the percentage of expenses to revenue is of particular interest " and this type is suitable also for representing operational results " in the case of shunting, cranage and other specialised services."

It is the fairly common practice of dock and harbour undertakings to allocate every item of expenditure under one or another of four main divisions:—(1) Administration (2) Operating (3) Maintenance and (4) Financial Charges. The Traffic Manager is particularly concerned with the second of these, viz.: Operating. Over against these four heads of charge must be set the whole gross revenue of the Undertaking. It is not uncommon to encounter the Traffic Manager who has the sincere belief that the whole of the revenue is of his making and that the excess of gross revenue over operating costs is his " profit," which is whittled away by the other three " spending " departments. Perhaps this erroneous (but pardonable) belief is not so widely held as in more simple days. Certain it is that the Traffic Manager could not go on operating very long, without an over-all administration to care for matters which are not his worry, nor without good maintenance of his plant and equipment (as well as of the the outer works of the port), nor yet again unless the bondholders with money invested in the port were getting their interest regularly.

It is good practice to make an estimate of the probable total expenditure of the Undertaking before the year's work begins; and it is useful to have all expenditure produced in monthly totals as the year runs its course and to compare the monthly totals with the estimate. Some managers also like to indulge in the highly speculative task of estimating annual revenue and then watch the course of actual revenue against the estimate. Frequently, the chief lesson learned is the chronic mutability of human affairs. But actual total expenditure (with some annual items arbitrarily divided over the twelve months), against actual revenue, is a comparison well worth watching, as closely and continuously as possible, throughout the year.

Every manager likes to keep track of the course of his principal trades for comparison with (1) last year (2) the last pre-war year (3) the best year ever, and (4) an average year. Daily figures are appropriate in some trades, and less frequent returns in others. Cumulative totals are always desirable. Diagrams help some people; others prefer graphs. In whatever form the information is

Port Operation—continued

submitted, tne important thing is to study it. If nobody studies it, it is probably unnecessary and should be scrapped.

It will be obvious to anybody who has ever seen a dock or harbour that ordinary costing methods cannot be applied to such undertakings. The difficulty is the first step—deciding upon a unit of production. Nevertheless, the management wants to know what is spent, what is being done for the money and whether what is being done is less or more than it used to be, or should be, or could be. It is to these ends that the patient dock accountant devises systems of recording, analysis, collation and comparison; and the wise traffic manager will co-operate with him to the utmost reasonable extent. Many operations on a given dock estate occur many times over every year. The principal operations, concerned with the staple trades, can be costed every time they occur and the results can be summarised and plotted; and everybody will learn something from the results, if it is only how much things can vary even when they look alike.

There used to be a rough-and-ready doctrine that tonnage dues must pay for ship facilities, dues on goods for goods facilities, and labourage rates for operations performed upon goods; and they must all three contribute their quota to the overheads of the Undertakings. But as Ross Johnson remarks in his "Modern Dock Operation," "in practice, of course, this ideal can only be attained very approximately." However, it can always be borne in mind. Over a fair stretch of years, particularly in an Undertaking which has expanded and is still expanding, it is sometimes useful to take the total quayage in linear feet and divide it into the gross statutory revenue. After making all necessary adjustments for the changing value of money, the result per linear foot often possesses an interest even though it be only academic. It is also helpful to take out the average quantity of goods passing over each linear foot of quay per annum over a term of years.

In his thoughtful articles mentioned above, Mr. Philpott mentions two other such broad tests. Take the total man-hours of every person employed by the port authority and relate it to the total throughout in tons of goods; and compare the resultant figure over a stretch of years. And again, take the total annual n.r.t. of vessels using the port and test that against the cost of maintenance, dredging and administration, and see what the trend is over the years. He calls these "over-all comparisons" but, if all the right adjustments are made, they have their interest and their usefulness for port operators and port administrators.

Finally, assuming that the General Manager and the Traffic Manager are regularly getting the sort of statistical information they want, and assuming that they are carefully studying it and discussing it, what are they going to do with it? First, they will use the principal totals and comparisons for periodical reporting to their Committees and the Board. Second, they will have the results permanently recorded, in much or little detail in some convenient form for quick reference at any time. Third, they will use the information in future operation and/or administration to help them find the right answers to such questions as the following:

(1) Seeing that such-and-such an operation is frequently costing us more than we receive for it, can we increase the charge? Or shall we let it alone and rely upon the reasonable surplus which is accruing from certain other, associated operations?

(2) Can we cut down the expense of this costly operation by any proper means? Is the job over-manned? Or is mechanical power being wasted? Or can the supervision be improved?

(3) Seeing that a given operation costs less at Berth A than at Berth B, can we allocate more of this type of work to Berth A? Does the fault lie with the equipment or with the layout at Berth B? Is the equipment approaching the obsoleseing stage? Or is it being badly handled? Can the layout be economically improved?

(4) Is all the overtime working properly justified? Where the cost should be recovered, is it being recovered?

(5) Having regard to the varying costs of given jobs at different berths, how shall we equip and lay out the new berth now under construction (or in contemplation)?

Endless figures can be compiled about the working of even a small port and many of them can be useful. But we would end these few notes, on an alluring subject, as we began. Make sure first what you want to know; be sure, when you get it, that it is the thing that you wanted; and as soon as you stop using it, scrap it.

(To be continued)

International Conference on Safety of Life at Sea

Good Progress by Five Working Committees

Five committees set up for the convenient division of the work of the International Conference on Safety of Life at Sea have been in almost continual session in London since their appointment, and excellent progress is reported in the discussions.

Representatives from 30 countries are attending the conference, which opened in London on April 23rd. The purpose of the conference is to examine the provisions of the International Convention for the Safety of Life at Sea signed in London on May 31st, 1929, in the light of the experience of the past 20 years, and particularly of the war years, and of the progress that has been made in scientific aids to navigation.

Details of the five working committees and the progress they have made are as follow:—

Construction Committee

Chairman, Mr. K. H. Sjoholm (Sweden); vice-chairman, Mr. H. V. Anderson (Canada); joint secretaries, Mr. A. R. Hiscock and Mr. S. A. Hodges (U.K.).

This committee is concerned with the proposals that have been put forward for amendment of the 1929 convention with respect to the following matters:—

Watertight sub-division of passenger ships and cognate structural matters, pumping arrangements, structural fire precautions, stability, power for going astern, steering gear and any other structural requirements relating to passenger ships; fire detection and extinction in passenger ships. The committee is required to consider whether any requirements on these subjects should be laid down for cargo ships. In addition, it falls to the committee to consider the proposals which several countries have submitted for the introduction into the convention of specific requirements relating to ships' electrical installations.

After a preliminary review of the various proposals, the committee formed two sub-committees, as indicated below, to study the proposals on particular subjects and to make recommendations in regard to them.

The engineering sub-committee, which is concerned with pumping arrangements, fire detection and extinction, steering gear, power for going astern, and electrical installations, has agreed on the main lines of the requirements on these subjects, which it considers the new convention should make applicable for passenger ships. A draft text for this purpose is now in preparation, and will shortly be submitted to the construction committee for consideration.

The structural sub-committee is concerned principally with the watertight sub-division arrangements of passenger ships and related structural matters, and structural precautions against the spread of fire in passenger ships, including the provision of sprinklers.

Two panels have been formed from this sub-committee to study the report on the proposals from the delegations dealing with the above main subjects. These panels are still sitting and are collating information regarding these important technical matters for presentation to the sub-committee. Cognate details regarding them have in the meantime been considered by the sub-committee and agreement reached on a large number.

Life-Saving Appliances Committee

Chairman, Mr. Ove Nielsen (Denmark); vice-chairman, Mr. Van't Haaff (Netherlands); secretary, Mr. C. W. Wood (U.K.).

International Conference on Safety of Life at Sea—continued

This committee is considering the extent to which the provisions in regard to life-saving appliances, musters and drills, contained in the 1929 convention, require to be modified in the light of the experience that has been gained since the existing provisions, which apply only to passenger ships, were laid down.

So far the most important tentative decisions of the committee are:—

1. In addition to covering passenger ships the requirements in regard to life-saving appliances, and musters and drills in the new convention should also apply to cargo ships of 500 tons gross tonnage and upwards.

2. All new ships over 150-ft. in length (passenger ships and cargo ships) are to be fitted with mechanical davits of either "luffing" or "gravity" type.

3. All lifeboats are to be Class 1 (A) boats fitted with internal buoyancy.

4. The lifeboats of all passenger ships irrespective of their tonnage, and of all cargo ships of 1,600 tons gross tonnage and upwards, must include at least one mechanically-propelled lifeboat —either motor or hand-propelling gear.

5. All lifeboats certified to carry 60 or more persons must be fitted with mechanical means of propulsion which may be either motor or hand-propelling gear.

6. Motor boats are to be divided into two categories called Class A and Class B. The former must be an ignition compression engine (Diesel) capable of a speed of 6 knots in calm water, while the latter may be any type of engine capable of giving a speed of 4 knots in calm water.

Radio Committee

Chairman, Commodore E. M. Webster (United States); vice-chairman, Col. A. H. Read (U.K.); secretary, Mr. F. G. Pope (U.K.).

This committee is composed of members from the delegations of 25 of the countries represented at the conference.

The committee is considering the extent to which radio-telegraphy and radio-telephony installations, including auto-alarms, should be required in passenger ships and cargo ships and the technical requirements for such installations, the technical requirements for radio apparatus installed in lifeboats or portable radio apparatus carried on ship for eventual use in lifeboats, the number of qualifications of radio officers to be carried for safety purposes, particulars of watches to be maintained, details of radio procedures, e.g., alarm, distress and urgency radio signals, speed of distress messages and entries in log books.

Later the committee will also consider the technical requirements relating to direction finders and to other electronic aids for position finding and radar.

So far, the most important tentative decisions of this committee are (1) that as a general principle, radio of some kind should be carried for safety purposes in ships of 500 tons gross and upwards, voyaging between a port in one country and a port in another country; and (2) that in all ships of 1,600 tons gross and upwards continuous safety watch should be kept on the radio-telegraph distress frequency of 500 kc/s by means of either radio officers or by a radio officer and an auto-alarm.

Safety of Navigation Committee

Chairman, M. G. Anduze-Faris (France); vice-chairman, Mr. Kushnarev (U.S.S.R.); secretary, Mr. W. F. S. Jelly (U.K.).

This committee is composed of members from the delegations of 27 of the countries represented at the conference. It is considering proposals for the amendment of the Collision Regulations, and all other matters covered by the safety of navigation chapter of the 1929 convention; also navigational aids (except the technical aspects of radio navigational aids); life-saving and distress signals and the carriage of explosives and dangerous goods.

The committee, which is working through sub-committees, has made excellent progress in its review of the International Collision Regulations, and it is expected that for the first time it will be possible to incorporate in an international convention a complete set of rules relating to the lights to be carried, the signals to be made and the manœuvres to be carried out by ships at sea.

The committee is also considering such important and complex questions as the provision of meteorological services, danger and distress signals and procedure and the carriage of direction finders in passenger and cargo ships.

General Provisions Committee

Chairman, Mr. N. A. Guttery, C.B. (U.K.); vice-chairman, Capt. A. Bachas (Greece); secretary, Mr. J. H. P. Draper (U.K.).

This committee is charged with arriving at definitions applicable to more than one technical committee, such as that of a passenger ship; with making provisions as to the acceptance, entry into force, enforcement and future modifications of the convention; deciding on future arrangements affecting international safety regulations and co-ordination of certain aspects of the work of the technical committees.

The committee has almost completed the work relating to the coming into force, etc., of the convention. It has been agreed that, as under the 1929 convention, a cargo ship shall not be allowed to carry more than 12 passengers, and it has agreed that children under one year of age shall not be reckoned as passengers subject to such provision as may be made for them by life-saving appliances committee in respect of providing accommodation in lifeboats.

British Transport Commission

Re-organisation of Inland Waterways

The British Transport Commission announce that the Docks and Inland Waterways Executive have arranged to reduce the number of Waterways Divisions from five to four (exclusive of Scotland) as from 24th May last. At the same time, the separate organisations inherited from the previous owners will cease to exist and within each Division, the administration will be unified under a Divisional Waterways Officer, responsible to the Executive, at a Divisional Headquarters Office, with branch officers as required. The new divisions, the names of the divisional waterways officers and the divisional headquarters are as under:—

North Eastern Division, comprising the former Aire & Calder (with Goole Docks), Calder & Hebble, Sheffield and South Yorkshire and Trent Navigations, also section of the former Grand Union Canal North of Leicester. Divisional Waterways Officer: Mr. H. B. Emley, C.M.G. Headquarters: Leeds.

North Western Division, comprising the former Leeds and Liverpool Canal, Weaver Navigation (including West Point Dock) and the Staffordshire and Worcestershire Canal north of Autherley. Divisional Waterways Officer: Mr. C. M. Marsh, M.I.C.E. For the present the headquarters of this division will be at Northwich, but it is intended later to transfer them to Liverpool.

South Western Division, comprising the former Sharpness and Gloucester Canal (including Sharpness and Gloucester Docks), Severn Navigation, Worcestershire Canal south of Autherley, Birmingham Canal Navigations west of Birmingham and the Stourbridge Canal. Divisional Waterways Officer: Mr. A. C. Lisle, O.B.E. Headquarters: Gloucester.

South Eastern Division, comprising the former Grand Union Canal (including Regents Canal Dock) but excluding portion north of Leicester, Birmingham Canal Navigations east of Birmingham, and the Oxford, Coventry and Lee and Stort Navigations. Divisional Waterways Officer: Mr. C. Saywood. Headquarters: London.

The railway-owned canals will be integrated in the above divisions as they are transferred to the Docks and Inland Waterways Executive.

For the present the Caledonian and Crinan Canals, which are administered by the Executive, will continue under the existing local arrangements for maintenance and operation.

Mechanisation at Australian Ports

Timber Handling by Straddle Truck

By L. T. SARDONE.

Rapid progress is now being made in the loading and unloading of ships in Australian ports by modern mechanical materials-handling units, such as fork-lift trucks, mobile cranes and self-loading straddle trucks. The latter are particularly useful for the handling of bulk timber, piles, sawn timber, metal sheets and lengths of piping.

In view of the urgent demand for the cargoes of overseas ships laden with timber, careful attention has been given to a more rapid method of unloading and transporting such cargoes to the various points of distribution.

Straddle Truck handling Timber at an Australian Port.

Replacing the old process of handling heavy lengths of timber, poles and long lengths of sawn timber by the piece, mechanised units are now handling unit-loads of five tons and upwards with no more manual labour than that required for the fitting of ships' slings in the hold, and casting the slings loose when the unit-load is lowered to the apron of the wharf.

Much of the time gained in the unloading of these cargoes can be credited to the straddle truck, a self-loading unit which has been made available by the Commonwealth Handling Equipment Pool, an organisation established by the Australian Government to step-up the loading and unloading of ships during war years.

By the use of straddle trucks, the old method of hand-loading timber on to motor trucks is entirely eliminated. Instead, this mechanical self-loading unit is driven over the top of the unit-load then, on the manipulation of a lever by the driver-operator, the timber is gripped in metal clamps, raised a foot or so from the ground, and so instantly made ready for delivery to the particular timber-yard to which it has been consigned.

By these means, the timber is carried clear of the wharf as quickly as it is released from the ship's slings and transported direct to the timber-yards without any need for manual handling. On arrival at its destination, the straddle truck is driven to the selected spot, the timber lowered to the ground and released, and the unladen unit driven back to the wharf for a further load.

In appearance a straddle truck may be likened to an ordinary table-top motor truck minus axles, bonnet and driver's cab. The table-top stands approximately 7 feet from the ground and is supported on a frame of four legs, to each of which is attached a large tractor-type wheel, shod with a pneumatic tyre.

The power unit and driver-operator are housed on the table-top, the load being carried underneath and between the wheels. Where timber longer in length than the truck itself is being transported, the ends of the timber protrude at the front and rear. The clamps which grip the unit-loads are situated at the side and underneath the truck, and are capable of being lowered to ground level to permit them taking hold of the load about to be transported.

At Newcastle, New South Wales, in recent months, an overseas ship heavily laden with timber had almost all of its cargo removed from the apron of the wharf by two straddle trucks. As the ship's gear lifted the five-ton unit-loads of timber from the holds and lowered them to the apron of the wharf, straddle trucks quickly moved them away from the unloading area.

With only two such mechanical units operating, it obviously was impossible to transport each unit-load direct from the ship's side to the timber-yards. The practice therefore adopted in this instance was for one of the trucks to lift the unit-loads from the wharf apron and carry them direct to a stacking point clear of the unloading area, where another truck picked up the unit-loads and transported them to various parts of the district. Never less than a four-ton unit-load was lifted at a time, and almost as soon as the last load was released from the ship's slings the whole of the wharf space was available for the working of another ship.

The advantages gained from the use of straddle trucks included freedom from motor transport congestion, either on the wharf or in the unloading area; the provision of ample space for the working of the ship's cargo at all times; a speedier turn-around of the vessel; complete elimination of exhausting effort by waterside workers; and a rapid and more economical delivery of the ship's cargo direct from the wharf to various timber-yards in the Newcastle area.

On another occasion the straddle trucks were called upon to make round trips of about three miles, but this presented no difficulty, as these units are capable of transporting their cargoes at a speed which compares more than favourably with any large motor truck.

Straddle trucks are manufactured in a series of models capable of carrying loads from approximately five to thirteen tons with a reasonable safety factor.

Radio Advisory Service

A New Aid for British Shipping

The Chamber of Shipping and the Liverpool Steamship Owners' Association have established a Radio Advisory Service on behalf of British shipping. It will be financed jointly by the two organisations, and will operate as from 1st July.

The functions of this service will include the giving of confidential advice to individual firms requiring it in the many electronic problems which are now arising, and ensuring, in general, that British shipping managements, irrespective of size, are kept effectively in touch with developments. Thus by concentration of effort it is sought to make widely available a type of technical assistance which has hitherto been lacking.

Capt. F. J. Wylie, R.N. (retd.), has been appointed to direct the Radio Advisory Service. He will already be known to many in his recent capacity as Director of Radio Equipment at the Admiralty. He was largely concerned with the preparations which made possible the production of radar for the Merchant Navy. He will be assisted by a small staff and the headquarters of the service will be at 3, Bury Court, in the same building as the Chamber of Shipping and the London Office of the Liverpool Association.

The past ten years have seen rapid developments in the application of electronics to serve the needs of shipping. Originally confined to communication by radio telegraphy, in which field marine users may be said to have something akin to founder's rights, it soon spread to include direction-finding and echo-sounding.

The spur given to invention by war has to its credit many navigational aids to position fixing at sea such as Decca, Loran and Consol, and the first-named will soon give coverage round the British Isles.

Short range telephony is already firmly established amongst the smaller ships and its use is likely to be extended by decisions at

(Concluded at foot of next page)

Notes of the Month

New Ship Canal for the Port of Calcutta.

According to announcements in the Press, the Indian Central Board of Transport are considering a scheme for the construction of a ship canal between Diamond Harbour and the Kidderpore Docks. The object of the scheme is to short-circuit the 42 miles of dangerous and difficult river navigation on this stretch of the Hooghly and to provide a sheltered deep water approach to the dock system at Calcutta.

Dundee Harbour Dredging Plans.

Arrangements to dredge the approaches to Dundee Harbour, at a cost of more than £40,000, were approved at a special meeting of the Harbour Trustees held during last month. It was reported that consultations had taken place between the Trustees and representatives of K. L. Kalis, Sons & Co., Ltd., London, dredging contractors, whose original tender for the work amounted to £59,000. Messrs. Kalis had subsequently amended their tender to £34,000, provided they obtained the use of the Trustees' steam hopper and a tug. The Trustees approved an arrangement to recall the hopper, which is now working in the Mersey on Charter.

Free Port at San Francisco.

The Port of San Francisco has been granted permission to establish a free zone which will be known as Foreign Trade Zone No. 3. The application to operate a free port has been filed since 1936, and the grant authorising the zone was issued by Mr. Averell Harriman, former U.S. Ambassador to Britain, and now Secretary of Commerce, in his capacity as chairman and executive officer of the Foreign Trade Zones Board. Latest reports indicate that other United States ports, including Los Angeles and Seattle, are considering the advantages of a foreign trade zone in their respective harbours.

Improved Port Facilities in the Belgian Congo.

Extensive improvements to port installations in the Belgian Congo will be carried out under the programme announced by the Belgian Colonial Government. In Leopoldville plans are being drawn up for the building of further quays and for important extensions to the present storage installations. The Port of Matadi will likewise be enlarged while in Boma a special quay for the berthing of banana boats is planned. In Stanleyville a new quay will be built on the right bank of the river. Improvements will also be carried out at Bumba. The programme also includes the modernisation of the lighthouses in the Atlantic Ocean to facilitate entry to the mouth of the River Congo where a new navigation channel will be opened. Finally, measures are to be taken to improve and increase the navigation facilities on the River Congo and the River Kasai.

Belfast Port Scheme.

Following a recent meeting of the Belfast Harbour Board, it was announced that the Commissioners have approved in principal proposals for the reconstruction of Queen's Quay and the harbour engineer has been authorised to prepare estimates. The plans include the widening of the existing quay by 10-ft. to enable the depth of water to be increased and the strengthening of the existing structure with the provision of an additional crane rail to carry new cranes now on order from Babcock & Wilcox, Ltd.

Cargo Traffic Record at Polish Ports.

The total amount of cargo handled in Polish ports in April was 1,421,000 metric tons. This is an increase of about 237,000 tons compared with the preceding month, and sets a post-war record of cargo traffic in Polish ports. The Port of Gdynia-Gdansk handled 1,132,000 tons, Szczcin 223,000 tons and the three smaller ports of Ustka, Darlowo and Kolobrzeg 66,000 tons together. Cargo traffic at Szczecin was 56 per cent. greater in April than in March. Coal, coke and bunkers formed 82 per cent. of the total amount of goods which passed through the ports.

Tayport Harbour to be Dredged.

Sir Cyril Hurcomb, chairman of the British Transport Commission, recently announced that the dredging of the harbour at Tayport (Fife) will be undertaken shortly. The harbour, which belonged to the London & North Eastern Railway Company, has gradually been becoming derelict since the outbreak of the recent war. There was a big pre-war trade in the importation of esparto grass, timber, wood pulp and china clay, and in the export of coal and stone chips. Work at Tayport will begin in September provided operations now in progress at other ports can be dealt with as planned. During 1945-46 more than 53,000 tons of silt was dredged from Tayport Harbour, but the work was suspended before the approaches had been cleared.

Pittenweem Harbour Improvement Proposals.

Pittenweem Town Council, after due consultation with interested parties, have submitted to the Scottish Home Department new proposals for the improvement of Pittenweem Harbour. These aim at providing dock gates with a jib to the west pier; and a breakwater to the fullest extent of the existing foundations. The provision of a spur, blocks or a jetty running for 50 to 70-ft. beyond the breakwater is also suggested to minimise the danger in the last 100 yards of the treacherous approach. The new plan is a compromise between the Council's original £55,000 scheme, rejected by the Scottish Home Department, and the plan submitted by the Department's engineers in consultation with the Town Council's engineers.

Radio Advisory Service

(Continued from previous page)

the Safety of Life at Sea Conference now in session, as also may be the employment of radio in survival craft both for sea and air and including ship's lifeboats. Further developments in short range telephony using very high frequencies may also be expected, in order to give a service approaching that of a land line connection before a vessel docks.

Pride of place amongst war developments must perhaps be given to radar. Due to far-sighted and timely action by the Admiralty, the Ministry of Transport and the radio manufacturers, Britain to-day leads the world in peace, as she did in war, in this field. With the assistance of the shipping industry intensive study has been given to the operational characteristics required and equipment to an agreed performance specification is now in production.

The Radio Advisory Service has been set up in view of the ever-growing technical complexities involved and the diversity of detail requirements in specialised ships for different trades.

SITUATIONS VACANT.

CHIEF ENGINEER (CIVIL), LYTTELTON HARBOUR BOARD, NEW ZEALAND.

The closing date for applications for the above position, at a salary of £1,500 New Zealand Currency, has been extended to 31st July. Applicants are to state details of experience in Dock and Harbour construction. Conditions of appointment obtainable from the Office of the New Zealand High Commissioner, New Zealand House, The Strand, London.

MECHANICAL ENGINEER required for East Africa by well known Public Works Contractors. Applicants must have thorough knowledge of steam and diesel and have had experience afloat, particularly handling and mooring craft. Length of service three years. Free furnished quarters and medical attention. Kit allowance. Write Box No. 604, c/o Judds, 47, Gresham Street, London, E.C.2.

FOR SALE.

HARBOUR LAUNCH, length 24-ft., beam 7-ft. 3-in., draught about 2-ft. 3-in. 60 h.p. 6-cylinder Perkins Diesel Engine with maker's guarantee. Accommodates about 14 passengers or equivalent amount of stores in two covered cockpits. High speed. Ideal for harbour uses. Price £895. Ex-Clyde. M. A. Madden & Co., Ltd., 7, Victoria Street, London, S.W.1. Telephone: ABBey 2189.